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April 24th.

MR. LEA, President, in the Chair.

Forty-four members present.

The Committee to whom was referred the communication addressed to Isaac Lea, Esq., President of the Academy of Natural Sciences, by A. D. Jessup, E. A. Jessup and Clara J. Moore, under date of March 6th, 1860,

Reported, That the unsolicited efforts of the children of the late Augustus E. Jessup to ascertain any expressed intentions on his part to pecuniarily benefit the cause of science through this Academy, and the filial regard and liberal feeling evinced by them in fulfilling his supposed views, satisfy your Committee that the respect and esteem entertained by the Academy for the father, is also merited by the children of our lamented fellow member, Augustus E. Jessup, Esq.

Your Committee recommend that the President and Curators of this Academy shall, ex-officio, be a perpetual Committee under the direction of the Academy to carry out the intentions of the late Augustus E. Jessup, Esq., as expressed in the above mentioned letter of his children, A. D. Jessup, E. A. Jessup and Clara D. Moore, and that said Committee shall make a quarterly report of their proceedings, your Committee also recommend that a copy of the Publications of this Academy shall be furnished to each of the above named children of the late Augustus E. Jessup during life, commencing with the volumes now in progress.

WM. S. VAUX, Chairman of Committee.

The report was unanimously adopted.

The Committee of the Biological Department to whom was referred the communication "On the Physical and Chemical Characteristics of Corroval and Vao, two recently discovered varieties of Woorara, and on a new alkaloid containing their active principle, by William A. Hammond, M. D., Assistant Surgeon U. S. Army, and S. Weir Mitchell, M. D., Lecturer on Physiology, in the Philadelphia Medical Association," reported in favor of its publication in the Proceedings.

The following papers were, on the report of the Committees to whom they had been referred, ordered to be published in the Proceedings:

Conspectus Piscium in Expeditione ad Oceanum Pacificum Septentrionalem, C. Ringold et J. Rodgers ducibus, a Gulielmo Stimpson collectorum. SICYDIANÆ:

AUCTORE THEO. GILL.

SICYDIANÆ Gill.

Corpus elongatum, antice subcylindricum, squamosum vel nudum; aperturæ branchiales paulo fissæ, verticales; caput elongatum, rostro prominens; maxilla inferior triangularis, crassa; labium inferius plerumque dentibus gracilibus, confertissimis præditum.

Pinnæ dorsales duæ; pinnæ pectorales basi latæ fere verticales; pinnæ ventrales in modo disci conjunctæ, ad basin pectori adhærentes.

Hæc subfamilia bene distinguitur ab subfamiliis "Gobinæ" Gill et "Triden-

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tigerinæ" Gill pectori pinnarum ventralium adhæratione, et forma capitis et osteologia.

Genus I. SICYDIUM Val.

Corpus plerumque squamis ctenoideis obtectum; maxillæ superioris dentes gracillimi, confertissimi, uniseriati; maxillæ inferioris distantes, magni, præcipue prope symphisin; dentes labiales gracillimi.

Subgenus I. SICYDIUM.

Maxilla inferior superne ad symphisin et prope commissuras lateribus appendicibus carnosus prædita.

Typus *S. (Sicydium) Plumieri* Val. Hist. Nat. des Poissons, vol. xii.

Subgenus II. SICYPTERUS Gill.

Maxilla inferior appendicibus carnosus carens.

Typus *S. (Sicypterus) Stimpsoni* Gill nov. sp.

Genus II. SICYOGASTER Gill.

Corpus alepidotum. Dentes in utraque maxilla uniseriati; ei ad maxillæ superioris partem anteriorem crassi, tricuspidati, laterales simplices; maxillæ inferioris dentes anteriores remoti, simplices.

Typus *Sicyogaster concolor* Gill, nov. sp.

Genus SICYDIUM Val.

Sicydium Val. Hist. Nat. des Poissons, vol. xii, p. 18.

Corpus antice subcylindricum, versus pinnam caudalem regulariter attenuatum; squamæ imbricatæ, plerumque marginibus subrotundæ, nec angulatæ, valde pectinatæ, striis concentricis et radiantibus obsoletis; squamæ dorsales et laterales anteriores parvæ, cycloideæ.

Caput oblongum, subquadratum, latitudine altitudinem æquante vel superante; rostrum subverticale, obtuse rotundatum. Oculi cerciter in capitis parte mediana siti.

Os mediocre, fere horizontale, usque ad oculos extendens. Maxilla inferior triangularis, superiore brevior minorque, intus superiorem claudens; labia crassa, præcipue labium superius.

Dentes maxillæ superioris gracillimi, confertissimi, in serie unica dispositi; maxillæ inferioris in serie una, remoti, mediocres, ad utrumque latus symphisis majores.

Pinnæ dorsales omnino disjunctæ; pinna caudalis rotundata vel subrotundata, sub oculis desinens: maxilla inferior superiore brevior, minorque, intus superiorem claudens: labia crassa, maxillas dentesque tegentia.

Subgenus SICYPTERUS Gill.

1. *Sicydium Stimpsoni* Gill.

Caput latitudine antrorsum retrorsumque subæquale, vix quam altitudo majore; rostrum subverticale, obtuse rotundato; capitis longitudine corporis longitudinis extremi partem quintam æquante, latitudine capitis longitudinis 2-3 æquante, altitudine fere latitudinem æquante. Labium superius utrinque emarginatum fere sub nare, sub rostro fissum; intus papillarum serie circa marginem superiorem extendente et papilla unica supra sinum labii anteriorem præditum. Pori capitis in linea transversa arcuata pone oculos, et in linea brevi obliqua in operculi parte inferiorique, suboperculo, &c.

Pinna dorsalis prima radio secundo ejus filiforme, ultimo remotiori.

D. vi, 11; A 11; C 8, 13, 7; P 18; V i, 5+5 i.

Color subpurpureus, fasciis obscurioribus septem variegatus; pinnae dorsalis analisque basi albo punctulatæ; pinna caudalis albo punctulata.

Habitat in aquæ dulcis rivulis, lapidibus adherens, Hilo Hawaii.

Forsitan *Sicydio laticepiti* Val. proximum.

1860.]

Genus *SICYOGASTER* Gill.

Corpus alepidotum, antice subcylindricum, inde versus caudam lente attenuatum.

Caput oblongum depressum, altiore latius, antice rotundatum. Oculi in parte subanteriori positi. Os mediocre, horizontaliter fissum.

Dentes in maxilla utraque serie regulare unica dispositi; dentes circa maxillæ superioris partem anteriorem approximata, apicibus lateraliter dilatatis, tricuspidatis, cuspa mediana majore, subrotundata; dentes laterales pauciores, remotiores, simplices, subcylindrici et paulo recurvati. Dentes maxillæ inferioris partis anterioris subcylindrici recurvatique, remoti. Dentes labiales tenuissimi adsunt.

Pinnæ dorsales duæ, prima radiis valde flexibilibus; pinnæ caudalis marginē rotundata; pinnæ ventrales postice bene conjunctæ, antice funiculo musculari spinas connectente et membranæ marginem formante præditæ.

Hoc genus a *Sicydio* Val., valde differt corpore omnino alepidoto, dentibus trilobatis crassis in maxillæ superioris parte anteriore et dentibus maxillæ inferioris subæqualibus.

Eo referenda est unica species.

Sicyogaster concolor Gill.

Caput longitudinis totius partem quintam formans, altitudine sui longitudinis dimidiam superante. Maxilla superior circiter dentibus tricuspidatis sexdecim et latere utroque circiter dentibus simplicibus quatuor vel quinque armata; maxilla inferior circiter dentibus simplicibus remotis decem prædita.

D vi, 11; A 10; C+15+; P 15 V i, 5 + 5 i.

Color subpurpureus; pinnæ analis et ventrales submargaritacæ, analis purpureo marginata.

Habitat cum *Sicydio Stimpsoni* in aquæ dulcis rivulis saxi adhærens.

In specimine unico in collectione, labium inferior dentes graciles paucos habet.

 Monograph of the Genus *LABROSOMUS* Sw.

BY THEO. GILL.

In the genus *Clinus* as proposed by Cuvier, and even as revised by Valenciennes, there are dissimilar types which yet remain to be named and elevated to the rank of genera. Among the species of this group, described by the latter naturalist in the eleventh volume of the "Histoire Naturelle des Poissons," there are several species which are distinguished by the presence of superciliary tentacles, and of a transverse pectiniform series of filaments on the nape. Those fishes provided with such appendages, have at the same time a much less inequality between the spinous and soft portions of the dorsal than the typical *Clini*, and the teeth in the outer row are much stronger. They would therefore be correctly referred to a genus which is quite distinct from *Clinus*. For this genus, the name *Labrosomus*, first proposed by Swainson, must be adopted, but the characters given by that author to it are not the proper generic ones, and the greater number of the species referred to it are not congeneric with its type.

The name of *Labrosomus* (or *Labrisomus*) was first published in 1839, in the second volume of the "Natural History of Fishes, Amphibians and Reptiles." At the seventy-fifth page of that volume, Swainson has divided the Cuvieran genus *Clinus* into five genera: *Clinus*, of which the *Clinus acuminatus* Cuv., is taken as the type; *Labrisomus* with *Clinus pectinifer* Val., as type; *Tripterygion* Risso, *Clinitrachus* Reese, which is typified by *Blennius*

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variabilis of *Rafinesque*, and *Blennophis*,* of which the *Clinus anguillaris* Val., is the only true species. Of these genera, *Clinus* Sw., and *Clinitrachus* Sw., are distinguished by false or illusive characters, and cannot be regarded as distinct. The others are valid, but their characters require revision.

The only claim to distinction of the genus *Labrosomus* given by Swainson, are founded on the strong, conic and pointed row of front teeth, behind which are villiform ones; a thicker body than in *Clinus*, and the "dorsal fin distinctly emarginate towards the caudal." The genus resting on these characters alone is composed of very incongruous elements. To it are referred, at page 277 of the second volume, the following species, all of which are described as species of *Clinus* by Valenciennes: *Labrosomus gobio*, *L. pectinifer*, *L. capillatus*, *L. Delalandii*, *L. linearis*, *L. variolosus*, *L. Peruvianus*, *L. microcirrhis*, *L. ? geniguttatus*, *L. elegans*, *L. ? littoreus* and *L. latipinnis*.

Of these species, not more than three can, with propriety, be regarded as congeners, if the *Labrosomus pectinifer* is taken as the type. These are *Labrosomus pectinifer*, *L. capillatus* and perhaps *L. Delalandii*. The latter is more probably the representative of a distinct genus.

That genus is distinguished from *Labrosomus* by the smaller mouth, the presence of only two rays to the ventral fins, and perhaps by the undulating margin of the spinous portion of the dorsal fin. It may be named *Malacoctenus*, in allusion to the pectiniform row of filaments. This genus is the nearest ally of *Labrosomus*. All the others are very distinct.

Labrisomus gobio Sw., is the type of quite a distinct genus, whose characters consist of a broad, depressed head, with a very short muzzle, large approximated eyes, superciliary and nasal tentacles, two ventral rays and a comparatively short spinous dorsal. The genus may be called *Gobioclinus*. The only species *Gobioclinus gobio* is found in the West Indies, and has but eighteen dorsal spines.

Labrisomus linearis Sw., is synonymous with *Clinus brachycephalus* Val. This also is the type of a distinct genus distinguished by its abbreviated and blenniform head, the profile being very convex; by the villiform teeth, the absence of superciliary tentacles, the spinous portion of the dorsal long, and the presence of only two rays to the ventral fins. The name of *Blennioclinus* is conferred on it; for the species, the specific name of Valenciennes must be retained.

Labrisomus variolosus is distinguished by a large thick head, with lateral eyes, short superciliary tentacles and a small nuchal one. The mouth is large; the teeth of the jaws in an outer row strong and conical, behind which are villiform ones; those of the vomer and palate villiform and in three patches, one on the vomer and one on each palatine bone. The spinous portion of the dorsal is long, and the ventrals have each three rays. The species thus characterized is the type of a new genus which may be named *Anchenionchus*.

Labrisomus microcirrhis, *L. elegans* and *L. Peruvianus* are nearly related to *Anchenionchus*, and are from the same zoological province.

Labrosomus ? geniguttatus is distinguished from *Anchenionchus* by the more approximated eyes, and by the disposition of the vomero-palatine teeth, as well as the small size of the anterior row of maxillary teeth. The dorsal is moderately long, and each of the ventrals have three rays. The mouth is comparatively small, and there are superciliary, nasal and nuchal tentacles. For this species, the generic name of *Calliclinus* is proposed.

* Valenciennes has since given the name of *Blennophis* to a very distinct genus from that to which Swainson applied the names. As Swainson's genus is a natural one, another name must be substituted for that of Valenciennes—*Ophioblennius* is therefore proposed.

Labrisomus littoreus may possibly belong to the genus *Acanthoclinus* of Jenyns, but it is only known from a drawing and description.

Labrisomus latipinnis is related to *Blennioclinus*, but is distinguished from the species of that genus by the presence of superciliary tentacles. The generic name of *Ophthalmolophus* may be retained for it.

If the above views of the limits of the *Labrosomus* are correct, only two of the species assigned by Swainson to the genus truly belong to it. Of the remaining species, nearly each one belongs to a genus distinct from the others. The affinities and characters of the genera above indicated will be more fully exposed at another time.

About three years after the publication of the work of Swainson, the same species that served as the type of the genus of that naturalist, was described by Dr. Dekay, in the ichthyological part of his "Zoology of New York, or the New York Fauna," as the representative of a new genus of Percoids, under the name of *Lepisoma*. That the genus *Lepisoma* is identical with the *Labrisomus* of Swainson, no one can entertain a doubt after a perusal of the generic and specific description of Dekay.

Dr. Dekay has given the characters of his genus *Lepisoma*, as follows:

"Body and fins scaly. Fleshy filaments along the basal line of the head and on the orbits. A single dorsal fin. Branchial rays six. Teeth in the jaws vomer and palatines. Ventrals before the pectorals."

Dekay in his remarks, states "that it is with much hesitation that he places this genus at the end of the jugular section of this family (Percidæ). In its general aspect, it might readily be referred to the families Sciaenidæ or Labridæ; but the presence of vomerine and palatine teeth excludes it from them."

The amiable naturalist was much mistaken in regard to the affinities of the genus, as must be perceptible from his descriptions. Even in his brief generic diagnosis, the ichthyologist is surprised by the peculiarity described by the second sentence; "*fleshy filaments along the base of the head and on the orbits.*" This character is so peculiar, so much at variance with the compact character, if I may so express myself, of the head in the family of Percoids, that it might well cause the naturalist to doubt if a fish with such appendages can really belong to the family of Percoids. On a careful examination of the specific description, the characters are found to disagree more and more with the natural ones of the family to which Dekay has referred it.

The scales are described as being "moderate, rounded, finely striate on their free surfaces, with a smooth membranous margin." The head is "corrugated and destitute of scales. Along the basal line of the head, on each side, are nine or ten fleshy processes, ending in bifid or trifid filaments," &c. "Another fleshy process arises from beneath the upper margin of the orbit, which subdivides into six or eight smaller processes," &c. The anterior nostril has a "fleshy valve, through which is pierced the nasal aperture; its posterior border elongated and terminating in six or eight filaments." The opercle and preopercle are rounded and smooth on their margins."

All of the attributes of the species underlined in the foregoing abstract are more or less at variance with the characters of Percoid fishes, even as the family was accepted by Dr. Dekay; the doubt of the reader is still more increased when he finds it stated that the "*branchial membrane (is) large, extending loosely around the throat, with six rays*, and that the ventrals arise near the inferior fold of the branchial membrane, and are composed of two long articulated rays and a short rudimentary one on each side."

This condition of the branchial membrane, this number of ventral rays are so different from the characters of the true Percoids, that one can have no hesitation in denying a fish with such attributes a place in the family. As in all those as well as in minor details, it agrees with *Labrosomus*, it is unhesitatingly referred to that genus.

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The genus *Lepisoma* has been adopted by the following authors, but it is necessary to add, entirely on the authority of Dr. Dekay.

Troschel has translated into German the characters of the genus for the "Archiv für Naturgeschichte" of 1844, page 233. He has questioned the presence of three ventral rays.

Dr. Storer, in his "Synopsis of the Fishes of North America," has adopted it without qualification.

Sir John Richardson, in the article "Ichthyology" of the last edition of the "Encyclopædia Britannica," at page 277 of the twelfth volume, has taken the characters of the genus from the "Archiv," and on account of the presence of six branchiostegal rays, places it, together with *Boleosoma* and *Pileoma*, at the end of his family of *Theraponidæ*, but adds that he "cannot, without more data, fix their proper place in the system."

No notice has been taken of the genus *Labrosomus*, except in a reference of *Lepisoma cirrhosum* Dekay to it, in a recent number of the Proceedings of the Academy of Natural Sciences. That this is entitled to distinction appears to be evident, and its characters are now given.

LABROSOMUS Sw., emend.

Synonymy.

Labrisomus Sw., Nat. Hist., Fishes, Amphibians and Reptiles, vol. ii. pp. 75, 182, 277, 1839.

Lepisoma Dekay, Zoology of New York, Fishes, p. 11, 1842.

Blennius sp. auct.

Clinus sp. auct.

Body oblong, highest at the pectoral fins, thence attenuated towards the caudal. Scales moderate, covering the body and encroaching upon the vertical fins. Head compressed, naked, declining from the nape with a slight curve. Eyes large, separated by a narrow interval. Superciliary tentacles multifid, and one or two transverse rows of filaments across the nape. Nostrils approximated; the anterior ones with a tufted barbel on the posterior border. Teeth in the anterior row stout, recurved, conic and pointed, behind which is a band of villiform teeth. Vomerine and palatine teeth stout and conic, generally in a single row. Dorsal fin commencing near the nape; the spinous portion long, and with from sixteen to eighteen rays, slowly decreasing in height to the soft portion; the latter oblong, with its rays subequal and higher than the spinous portions. Caudal fin moderate, truncate or rounded, and disconnected from the dorsal and anal fins. Ventral fins jugular, closely approximated, each composed of three rays.

1. *Labrosomus pectinifer* Sw.

Synonymy.

Clinus pectinifer Val., Hist. Nat. des Poissons, vol. xi. p. 374, 1836.

Labrisomus pectinifer Sw., Nat. Hist., Fishes, Amphibians and Reptiles, vol. ii, p. 277, 1839.

Lepisoma cirrhosum Dekay, Zoology of New York, Fishes, p. 41, pl. 30, fig. 94, 1842.

Lepisoma cirrhosum Storer, Synopsis of Fishes of North America, p. 49, ib. in Memoirs American Academy, 1856.

Clinus pectinifer Müll. and Troschel con Schomburgh Annals and Magazine Nat. Hist., 2d ser. vol. ii, p. 16; ib. in Schomburgh's Barbados.

Clinus pectinifer Castlenau, Animaux nouveaux ou rares recueilles &c., dans l'Amerique du sud. Poissons, p. 26, 1855.

Labrosomus pectinifer Gill, Proc. Acad. Nat. Sci. Phila., 1860, p. 21.

There can scarcely remain a doubt of the identity of the *Lepisoma cirrhosum* of Dr. Dekay with the *Labrosomus pectinifer*. The only difference between the description of Dekay and that of Valenciennes, is respecting the 1860.]

orbital and nuchal filaments. The orbital filaments are stated by Dr. Dekay to "subdivide into six or eight smaller processes, each of which terminate in several slender filaments, not thicker than the finest thread;" Valenciennes describes them as divided to their base in ten or twelve slender filaments. Dr. Dekay informs us that the nuchal filaments are nine or ten on each side, each bifid or trifid; Valenciennes describes them as being arranged in two pectiniform rows, each row consisting of thirty or more.

Another variation of *Lepisoma cirrhosum* from *Labrosomus pectinifer* is concerning the vomero-palatine dentition; Dekay mentions that "in the upper jaw, in front, is a series of equal, conical, slightly recurved teeth, somewhat longer than those below, smaller on the sides; behind the outer row, in front, is a patch of minute crowded teeth. Similar teeth in bands on the vomer and palates. On the anterior part of the vomer is a very large solitary tooth." This description of the vomerine and palatine teeth is ambiguous, and may be variously interpreted. If by it is meant that the vomero-palatine teeth are in several rows, or in a villiform band, it widely disagrees with the *Labrosomus pectinifer*. In the latter species there is but one row of stout conic teeth, like those of the outer row of the upper jaw, with "a very large solitary tooth on the anterior part of the vomer." A figure is given of the dentition of the *Lepisoma cirrhosum*, but very little reliance can be placed on it. The vomerine and palatine teeth are certainly represented as pluriserial, but there is no "very large solitary tooth" represented on the vomer. A doubt may therefore arise respecting the propriety of referring *Lepisoma cirrhosum* to *Labrosomus pectinifer*. Considering, however, that the description of the former, in all respects except those above mentioned, agrees with the latter; that the number of rays is almost exactly similar; that in each, a larger tooth is at the front of the vomer, and that the description and figure of the dentition of *Lepisoma cirrhosum* do not agree with each other; it appears almost certain that the two belong to the same species, and that error has entered into the description and illustration of the species as well as in the allocation of the genus.

The *Labrosomus pectinifer* is widely distributed through the Caribbean Sea, and is found at the Islands of Barbados, Trinidad, St. Thomas, Jamaica, Cuba, as well as at the Bahama Islands and on the coast of Florida.

The specimens from which Valenciennes described the species were obtained at Brazil and at Bahia. A specimen from Brazil does not specifically differ from West Indian ones.

Valenciennes even observes that it is one of the small number of species that cross the Atlantic ocean. A specimen is stated by him to have been obtained by Adanson among the rocks of the Island of Gorea, in January, 1750.

2. *Labrosomus fasciatus* Gill.

Clinus fasciatus Castelnau, Animaux nouveaux ou rares recueilles, &c., dans l'Amerique du sud. Poissons, p. 26, pl. xii. fig. 2, 1855.

This species is very closely related to the *Labrosomus pectinifer* Sw., and it was at first believed that it was probably only a variety. My friend, J. C. Brevoort, Esq., has since sent me an outline of the figure of Castelnau and a copy of his description, and I am now disposed to regard it as a true species.

The *Labrosomus pectinifer* is sometimes found with four dark brown vertical bars, between which are smaller and more obscure ones, interrupted at the middle. Such appears to have been the variety mentioned by Drs. Müller and Troschel in their list of the Fishes collected by Sir Robert Schomburgk at the island of Barbados, and published in the "Annals and Magazine of Natural History" and the History of Barbados. This variety, in every other respect, resembles typical individuals of the species, and has, like them, the rays of the caudal and pectoral fins covered with five or six rows of spots.

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In the normal variety of the *Labrosomus pectinifer*, the bands, although present, are faint and confused.

The *Labrosomus fasciatus*, from the figure and description of Castlenau, appears to differ from the *L. pectinifer* or its variety, by the absence of the intermediate, interrupted and fainter bands, and of the rows of spots on the caudal, by the red color of the abdomen and opercula, and of the ventral, pectoral and caudal fins, as well as of the broad marginal band of the soft portion of the dorsal fin. The following is the description given by Castlenau :

“Ressemble pour la forme au *pectinifer*, et a une tache semblable à l'opercule. Le corps est d'un brun clair avec quatre, larges bandes transversales d'un brun très obscur; l'opercule, la gorge, la partie inférieure de la tête et la moitié antérieure des dessous du corps sont d'un beau rouge vif; les nageoires anale et ventrale sont de cette même couleur.

“De Rio Janeiro.”

3. *Labrosomus capillatus* Sw.

Synonymy.

Clinus capillatus Val., Hist. Nat. des Poissons, vol. xi. p. 377.

Labrisomus capillatus Sw., Nat. Hist. Fishes, Amphibians and Reptiles, vol. ii. p. 277.

Clinus capillatus Müll and Trosch., con Schomburgh, Annals and Mag. of Nat. Hist. 2d ser. vol. ii. p. 16; ib. in Schomburgh's Barbados.

The *Labrosomus capillatus* is recorded as an inhabitant of the same coasts as the *L. pectinifer*. It is very nearly allied to the latter, but differs from it by the immaculate pectoral fins, and the spot on the operculum is bordered with white.

4. *Labrosomus Xanti* Gill.

This species in form and proportions is very nearly allied to *Labrosomus pectinifer*.

It attains a length of about six inches. Of the length, the head, from the front row of teeth to the margin of the operculum forms a fourth part, and the caudal fin about a seventh. The greatest height is rather less than the head's length. The dorsal outline from the nape to the posterior third of the dorsal fin is nearly straight and scarcely convex, and thence gradually declines in a slight curve to the end of the fin, when the height of the caudal peduncle is scarcely more than a fourth of the length of the head.

The profile from the eyes to the snout slopes more gradually than in *Labrosomus pectinifer*, and the suborbital is less broad.

The dorsal commences behind the vertical of the preopercle, and the spines regularly increase in height towards the middle of the spinous portion, and thence slightly decrease towards the soft portion, which is almost twice as high as the last spine.

The pectoral fins are produced at its middle rays, and their length is equal to nearly a fifth of that of the body. The articulated rays of all the fins are simple and unbranched as in its congener.

D xviii. + 13; A iii. 18; C 7 + 7; P 14; V 3.

The color of the body is brown, crossed by about ten darker bands. The head is dotted with blackish, and from the posterior and inferior borders of the eye, two bands proceed obliquely to the margin of the preopercle. The opercle is darker than the preopercle, but there is no black spot. The dorsal has the basal portion of the membrane between the first and third spines blackish; the rest of the membrane is tinged with purp'le, but immaculate. The basal half of the fin is covered with scales as in *Labrosomus pectinifer*. The anal fin is crossed by six oblique purplish bands. The caudal, pectorals and ventrals are immaculate.

1860.]

This species is very nearly allied to the West Indian *Labrosomus pectinifer* and *L. capillatus* Sw., but differs from them in color and some minor details of form. The median tooth of the front of the vomer, which is so large in the *Labrosomus pectinifer*, is of the same size as the others in the *Labrosomus xanti*.

Old and young specimens were obtained by Mr. J. Xantus under rocks on Cerro Blanco. They are numbered 2334, 2335 and 2478 in the collection of the Smithsonian Institution.

I have dedicated this species to Mr. Xantus as a slight testimony to his worth and abilities: while engaged in his duties on the coast survey, and with many obstacles to contend against, on account of the present condition of affairs in Mexico, he has obtained a collection of terrestrial and marine animals, which is rich in new forms, and all the species of which are in the highest state of preservation.

5. *Labrosomus Herminieri* Gill.

Synonymy.

Blennius Herminieri Leseur, Journ. Acad. Nat. Sci. Pa., vol. iv. p. 361, 1825.

Clonus Herminieri Val., Hist. Nat. des Poissons, vol. xi. p.

This species appears to be nearly related to the other species of the genus, but is distinguished by the presence of only sixteen spines in the dorsal fin, and by a different pattern of coloration. The dorsal fin anteriorly has an elongate black spot. "The cheeks and head are rufous brown, vermicular with little blackish lines, which form an irregular kind of close net work."

The radial formula is as follows:

D 16, 11; A 20; P 16; V 3; C 14.

Specimens were taken at the West Indian Island of St. Bartholomews, in cavities of madreporic rocks, in the month of June, 1816, by C. A. Lesueur. It has not since been re-discovered.

Monograph of the Genus *LABRAX*, of Cuvier.

BY THEO. GILL.

There is found, in the Mediterranean sea, a fish which has, from the earliest times, attracted the attention of the inhabitants of the neighboring coasts from the abundance in which it is found and the size to which it attains. By the Ancients, as at the present day, it was much esteemed as an article of food, and was called by the Greeks *Λαβραξ* and by the Romans, *Lupus*. Of this fish, Cuvier has said that its appearance and almost all the details of its form recall to mind the *perch*, and that a just idea would be given of it by describing it as a "large, elongated and silvery perch."

From the *Perches*, however, it differs in several characters, which induced Cuvier to separate it generically, and for the name of the genus, he adopted the Greek designation of the species. The characters by which Cuvier distinguished it from the *Perches* were the presence of teeth on the tongue and of two spines to the operculum. It differs also from the true *Perches* in the armature of some of its bones, and by the shorter spinous dorsal fin, whose rays, in the European and allied American species, do not exceed the number of nine.

Though Cuvier was the first to properly distinguish the genus, its type had been long previously placed by Klein as the first of two species which he placed in a group, for which he used the same name of *Labrax*.

In the second and third volumes of the great "Histoire Naturelle des Poissons," Cuvier and Valenciennes have referred to the genus *Labrax* seven species, six of which are described in the former volume.

Of these, the *Labrax lupus* is the type of the genus, and is distinguished by

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the spur-like spines of the inferior margin of the preoperculum; the presence of a perfect marginal band of teeth and of an oval basal patch on the tongue; three spines to the anal fin, and other characters which will be noticed in the diagnosis of the genus. To this should the name of *Labrax* be restricted.

The second species (le Bar alongé, or *Perca elongata* of Geoffroy) is distinguished by finer and more numerous teeth on the inferior border of the preoperculum, and the presence of only two anal spines. This is doubtless the type of a distinct genus to which the name of *Dicentrarchus* may be given.

The third species is the *Labrax lineatus* of Cuvier, the common rock fish and striped bass of the United States. This is now taken as the type of a new genus, for which Mitchell's name of *Roccus* is preserved. The characters are given below. To this genus should be also referred the *Labrax multilineatus* described by Cuvier and Valenciennes in the third volume of their "Histoire."

The fourth species, *Labrax Waigiensis*, has been identified by Bleeker with the *Psammoperca datnioides* of Richardson; if this is correct,—and notwithstanding the discrepancies between the descriptions of the "Histoire Naturelle" and Richardson, such appears to be the case—it belongs to a very distinct genus from *Labrax lupus*. The teeth of the jaws, vomer and palatines are described by Richardson as crowded, rounded and granular, while by Cuvier the teeth on both jaws, the chevron of the vomer and the palatines are said to be villiform ("dents en velours"); it is also stated by Cuvier that there is a small oval disc at the base of the tongue. By Richardson, the tongue is said to be smooth. In the latter statement, however, he disagrees not only with Cuvier and Valenciennes, but with Bleeker, who also asserts* that there is an oblong patch at the base of the tongue; "lingua basi thurma denticulorum scabra." Both authors agree as to the presence of a single spine to the operculum (although one of the generic characters assigned to *Labrax* by Cuvier is the presence of two spines on that bone), and of a strong horizontal spine at the angle of the preoperculum, above which the margin is pectinated.

The next species in order,—*Labrax Japonicus* of Cuv. and Val.,—is the type of the genus *LATEOLABRAX* of Bleeker, which is widely separated from *Labrax* by the absence of any teeth on the tongue. In the plectroid armature of the operculum it, however, resembles that genus.

The last species—*Labrax mucronatus*—is now taken as the type of a new genus, for which the name of *MORONE* is accepted. Its generic characters and affinities will be given at length in a subsequent portion of this memoir.

Of the seven species referred by Cuvier and Valenciennes to the genus *Labrax*, six are thus seen to belong to different genera. Nor do any of these genera appear to be unnecessary, but on the contrary, all of them are well distinguished from each other by characters that ichthyologists must admit are of importance; two of the species, indeed, that were referred to the genus by the French naturalists, do not agree with their characters of that genus. It is not in disparagement of those celebrated and able men that these remarks have been made. The progress of scientific discovery and the examination of better materials have enabled their successors to discover the errors of the founders of modern ichthyology. None could have performed the work at that day better than they.

Having long since, from an examination of the descriptions of various authors, been aware of the confusion and uncertainty in which our American species of the Cuvieran *Labrax* were enveloped, I have thought that it might be a useful task to attempt the elucidation of the genus. More than three years ago, I had noticed that the *Labrax rufus* of *Dekay* belonged to a different natural genus from *Labrax*, but not having then had an opportunity of examining the European species, I believed that the *Labrax lineatus* was a true *Labrax*. The name which I had then applied to the *Labrax rufus* having never been published, I have now renounced it for that of Mitchell, not because

* *Natuurkundig Tydschrift voor Nederlandsch Indie*, vol. ii. p. 479.

he was the author of the genus, but because the name had been applied, though from a false idea, to one of its species.

The number of American species admitted by Drs. Dekay and Storer in the genus *Labrax* amounts to seven, and another specific name has been since added by Filippi, an Italian naturalist. It will be attempted to demonstrate, in the following monograph, that all of these nominal species are referable to three true ones. Three of the synonyms apply to one species and four to another.

Besides the species that have been attributed to the genus by Richardson, Dekay and Filippi, several others have been described under that name by modern naturalists. Dr. Charles Girard has noticed two of these in the "Proceedings of the Academy of Natural Sciences of Philadelphia," under the name of *Labrax nebulosus* and *L. clathratus*. He afterwards constructed for them a new genus which he called *Paralabrax*, and placed it in the vicinity of *Serranus*. They appear truly to belong there, or perhaps to the group composed of *Elastoma* Sw., or *Macrops* Dumeril, and *Etelis* Cuv.

Mr. Hill, of Jamaica, in a useful catalogue of the Fishes of that island, has also noticed a fish which he referred to *Labrax*, under the name of *L. pluvialis*, or the rainy weather chub. It is said by that gentleman to be confounded by the fishermen with the *Labrax mucronatus*, but differs from it by the presence of vertical bars, like those of the common perch of Europe and America. Is not this related to the *Perca Plumieri* of Cuvier and Valenciennes? The presence of the vertical bars would militate against its natural association with *Morone*, and it may perhaps be the type of a distinct genus or belong to the genus *Percichthys* of Girard.

For the facilities of investigating into the history of this group I am indebted to the Museum of the Smithsonian Institution.

I. LABRAX (Klein) Cuv. emend.

Synonymy.

Labrax Klein, Miss. V. p. 25, 1749.

Perca sp. Linn. auct.

Sciæna sp. Bloch.

Centropome sp. Lac.

Perseque sp. Lac.

Labrax sp. Cuv. Regne Animal, ed. prima, vol. ii. 1817.

Dentes maxillares, palatini et vomerini velutini; dentes linguales velutini in margine totio et fascia longitudinali mediana dispositi. Squamæ occipitales et interorbitales, et in genis pleurusque cycloideæ vel vix pectinatæ. Preoperculum postice serratum vel pectinatum, ad angulum plerumque subtusque spinis recurvatis antrorsum spectantibus. Operculum biaculeatum. Pinnae dorsales ad basin haud membrana elevata conjunctæ; pinna dorsalis prima numero radiorum haud decem superante. Pinna analis spinis tribus in magnitudine regulariter increscentibus.

The genus *Labrax*, as above restricted, is chiefly distinguished by the continuous band of villiform teeth around the margin of the tongue, and the oval disc at its base. It is most intimately allied to the genus *Roccus*, from which it is separated by the character of the lingual dentition and the plectroid inferior margin of the preoperculum; the latter character is seen in the less nearly allied genus, *Lateolabrax* of Bleeker.

But a single species of this genus is yet known.

Labrax diacanthus Gill.

Synonymy (partim.)

Perca labrax Linn. Systema Naturæ.

Sciæna diacantha Bloch.

The full synonymy of this species can be ascertained by reference to the

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"Fauna Italica" of the Prince of Canino; as it has been given by Cuvier as well as Carino, it is not necessary to more than refer to it here.

As many names had been given to the species before it was designated *Labrax lupus* by Cuvier, that name cannot be retained if we are to be guided by the rules of priority. A specific name given to it by Bloch is therefore adopted.

In the edition of the "Systema Naturæ" by Gmelin, the European *Labrax* appears under the name of *Perca punctata*. Cuvier and Valenciennes have shown that this name is only a misapplication of one by Linnæus, who had given it to a Sciænoid from North America, which he placed immediately before the *Perca labrax* in his System. Gmelin, in his edition of the same work, has by mistake omitted both the description of the Linnæan *Perca punctata* and the name of *Perca labrax*, so that the name of the former is there applied to the description of the latter. Bloch has also applied the name of *Perca punctata* to the young of *Labrax diacanthus*, but without allusion to the names of Linnæus or Gmelin. As the name thus applied would have at that time conflicted with the one of Linnæus, it should not be retained. The name of *Sciæna diacantha* coming next in order, its specific part must be adopted. Although the name of *Lupus* was bestowed on this species by the ancient Romans, that does not appear to constitute a valid reason for accepting it as a scientific name.

II. DICENTRARCHUS Gill.

Synonymy.

Perca sp. Geoffrey.

Labrax sp. Cuv. et Val.

Genus *Labriæi* Cuv. simile, sed preoperculo margine inferiore dentibus non validis, et pinna analis solum spinis duabus.

Dicentrarchus elongatus Gill.

Synonymy.

Le Bar alongé Cuv. and Val., Hist. Nat. des Poissons, vol. ii. p. 79.

This species I have never seen, but it evidently belongs to a distinct genus, and I have been, in a measure, compelled to give it a name in order to present a perfect view of the classification of the *Labraces*.

The species is an inhabitant of the Mediterranean sea.

The synonymy of the species is given in the second volume of the "Histoire Naturelle des Poissons," to which reference is made.

III. ROCCUS (Mitch.) Gill.

Synonymy.

Sciæna sp. Bloch.

Perca sp. Bloch, Schneid., Mitchell, 1818.

Centropome sp. Lac.

Roccus sp. Mitchell, Report in part on the Fishes of New York, p. 25, 1814.

Lepibema Raf. Ichthyologia Ohnensis, p. 23, 1820.

Labrax sp. Cuv., et Vol.

Corpus gracile vel oblongo-ovatum, dorso antice curvato. Dentes maxillares, palatini et vomerini velutini; dentes linguales velutini, in fasciis lateralibus et ad basin in seriebus duabus longitudinalibus separatis vel coalescentibus dispositi. Squamæ a nucha ad nares et in genis plerisque cycloideæ. Preoperculum postice subtusque pectinatum, operculum biaculeatum. Pinnae dorsales ad basin non membrana elevata conjunctæ. Pinna dorsalis prima numero radiorum non decem superante. Pinna analis spinis tribus in magnitudine regulariter incrementibus. Linea lateralis rectilinearis.

1860.]

The genus *Roccus* is very closely allied to both *Labrax*, as here revised, and *Morone*. From *Labrax* it differs chiefly in the character of the armature of the preoperculum, and by the absence of the teeth at the anterior extremity of the tongue; the whole margin of the tongue in the latter genus being provided with a band of villiform teeth, and the spur-formed teeth of the inferior margin of the preoperculum calling to mind the genus *Plectropoma* of Cuvier among the *Serrani*. The difference between the last named genus—or at least of many of its species—and *Serranus* is indeed not of as great value as that between *Labrax* and *Roccus*. The only constant character between *Serranus* and *Plectropoma*, as those genera were established by Cuvier, is the spur-like dentition of the inferior border of the preoperculum, while *Labrax* and *Roccus* are distinguished not only by an equally great and constant difference of the preopercular border, but also by the difference of the lingual dentition. As the former character is of as great value in the *Labraces* as in the *Serrani*, consistency will require that if *Plectropoma* and *Serranus* are considered as distinct genera, *Roccus* and *Labrax* should also be so regarded.

The difference between *Roccus* and *Morone* is of even more importance than that of *Roccus* and *Labrax*. The distinguishing characters will be referred to under the diagnosis of *Morone*.

The name which has been adopted for this genus is one given by Dr. Mitchell, in the year 1814, to a medley comprising the *Roccus lineatus*, which he called *Roccus striatus*, and the *Otolithus regalis*, which was designated as *Roccus comes*. The name was solely the result of ignorance on the part of the author, of the application of the ordinary terms used by naturalists at that day. The name itself is a barbarous latinization of the popular name, rock fish, by which its chief species is known in many parts of the United States. Notwithstanding these facts, it has been nevertheless deemed more advisable to accept the name than to apply a new one. It is scarcely worse than *Rattus*, *Kangurus*, *Catus*, *Gunnellus*, and many other names of similar derivation.

Rafinesque, in the "Ichthyologia Ohiensis," also proposed for his *Perca chrysops*, in case it should be found to be generically distinct from *Perca*, the name of *Lepibema*. He believed it to be distinguished "by the scaly bases of the caudal, anal and second dorsal fins, the last with some spiny rays, and all the three parts of the gill cover more or less serrulate, besides the small teeth." Rafinesque suggested that to this genus the *Perca Mitchelli* of Mitchell might "perhaps be found to belong."

The genus *Roccus* may be divided into two sections.

§ I. Corpus elongatum; dentes ad linguæ basin in seriebus longitudinalibus duabus ordinati.

Roccus lineatus Gill.

Synonymy.

Sciæna lineata Bloch, Ichthyologie, pars. ix. p. 53, pl. 305.

Perca ——— Schoepff., Schrift. der Gesells. Nat. Freund, vol. viii. p. 160.

Perca saxatilis Bloch, Systema Ichthyologiæ, Schneid. ed. p. 89.

Perca septentrionalis Bloch, Systema Ichthyologiæ, Schneid. ed. p. 90, pl. 70.

Centropome rayé Lac., Hist. Nat. des Poissons, vol. iv. p. 225.

Roccus striatus Mitchell, Report in part on the fishes of New York, p. 25, 1814.

Perca Mitchelli Mitchell, Trans. Lit. and Phil. Soc., N. Y., vol. i. p. 413, pl. 3 fig. 4.

Rock-Fish Mease, Trans. Lit and Phil. Soc., N. Y., vol. i. p. 502.

Perca Mitchelli } Raf. Ichthyologia Ohiensis, p. 23, (passim).

Lepibema Mitchelli }

Labrax lineatus Cuv. et Val., Hist. Nat. des Poissons, vol. ii. p. 79.

Perca labrax! Smith, Nat. Hist. Fishes of Mass., p. 277.

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- Labrax lineatus* Rich., Fauna Boreali-Americana, vol. iii. p. 10.
 “ “ Storer, Report on the Fishes of Mass., p. 7.
 “ “ Ayres, Boston Journ. Nat. Hist., vol. iv. p. 757.
 “ “ Dekay, Zoology of New York, Fishes, p. 7, pl. 1. fig. 3.
 “ “ Linsley, Catalogue of Fishes of Connecticut.
 “ “ Storer, Synopsis Fishes of N. America, p. 21, ib. in Memoirs Am. Acad.
 “ “ Storer, Hist. Fishes of Mass., ib. in Memoirs Am. Acad., vol. v. p. 55, pl. 1, fig. 4., 1853.
 “ “ Baird, Report on Fishes of New Jersey coast, p. ib. in Ninth Annual Report of Smith. Inst., p. 321.
 “ “ Holbrook, Ichthyology of South Carolina, p. 17, pl. iv. fig. 2.
 “ “ Gill, Annual Report Smith. Inst., 1857, p. 255.

This species is so well known and has been so frequently described and figured that no description is here needed. The best that has appeared is that of Holbrook in the Ichthyology of South Carolina; in that, the only correct account of the lingual dentition published by any American author, is given. The best illustration of the species is given by Sonrel in Dr. Storer's "History of the Fishes of Massachusetts," and is superior to that of Dr. Holbrook.

Cuvier and Valenciennes have described the tongue as having asperities only on its sides, while other naturalists have stated that the teeth on the tongue are most obvious on its sides," or more correctly that the "tongue is rough at its base and upon its sides and smooth in the centre." Dr. Holbrook has well said that "there are two bands of minute teeth, at the root of the tongue, separated slightly from each other in the mesial line; the sides of the tongue are also armed with small teeth."

Prof. Filippi, a learned naturalist of Turin, has also correctly described the lingual dentition of *Roccus lineatus* in comparison with a species of the genus which he regarded as new, but which has, in this monograph, been considered as identical with the *Roccus chrysops*.

‡ II. Corpus oblongo-ovatum, compressum; dentes ad linguæ basin in turma ovali aggregati.

Roccus chrysops Gill.

Synonymy.

- Perca chrysops* } Raf., Ichthyologia Ohiensis, p. 28.
Lepibema chrysops }
Labrax multilineatus Cuv. and Val., His. Nat. des Poissons, vol. iii. p. 588.
Perca multilineata Les. fide Cuv. and Val.
Labrax notatus Smith, in Rich. Fauna Boreali-Americana, vol. iii. p. 8, 1836.
Labrax multilineatus Kirtland, Boston Journal Nat. Hist., vol. v. p. 21, pl. 7, fig. 1.
 “ “ Dekay, Nat. Hist. of New York Fishes, p. 14.
Labrax albidus Dekay, Nat. Hist. of New York Fishes, p. 13, pl. 51, fig. 165.
Labrax notatus Dekay, loc. cit., p. 14.
Labrax multilineatus Storer, Synopsis of the Fishes of North America, p. 22, ib. in Memoirs of American Acad.
Labrax notatus Storer, loc. cit., p. 22.
Labrax albidus Storer, loc. cit., p. 23.
Labrax osculatii Filippi, Revue et Magazin de Zoologie, 2d series, vol. v. p. 164.
Labrax chrysops Gill, Proc. Acad. Nat. Sci., Phila., 1860, p. 20.
 Non *Labrax chrysops* Girard.

The *Roccus chrysops* of this monograph is undoubtedly identical with the *Perca* or *Lepibema chrysops* of *Rafinesque*, and the *Labrax multilineatus* of the "Histoire Naturelle des Poissons" and of Kirtland. The descriptions that have been yet given of the species under those names are meagre and unsatisfactory, but the notice of the color given by the above 1860.]

named authors and the possession of specimens from the same hydrographical basins as those from whence the fishes described by them were taken, leave no doubt as to the identity of the species.

Rafinesque's description of his *Perca chrysops* is, like almost all his descriptions, inapplicable to any known fish, but it agrees with the *Morone chrysops* better than any other species. Rafinesque erroneously attributes to his species six branchiostegal rays, a single opercular spine, eight spines to the first dorsal fin, and places it under the genus *Perca*, all the species of which, he informs us, have naked heads. He proposed for it a new genus to which he gave the name *Lepibema*, in allusion to the scaly bases of the unpaired fins.

Lesueur subsequently sent to the Parisian Museum two specimens of a species which he called *Perca multilineata*, which Cuvier and Valenciennes placed in their genus *Labrax*, but adopted for it the specific name of *Lesueur*. Their description is mostly comparative, it being said to differ from the *Labrax lineatus* by its higher body, shorter head, more feeble teeth, the stronger asperities of the tongue, and especially the larger scales of the maxillaries, which resemble those of *Labrax mucronatus*, while in *Labrax lineatus* they were said to be scarcely perceptible.

The description of the lingual dentition is very unsatisfactory, and no correction is made of the statement made in the second volume that the *Labrax lineatus* has only lateral teeth. It is not in the development of the asperities of the tongue that the lingual dentition of the species differs, but that while there are two narrow rows separated by a mesial line in *Roccus lineatus*, the rows are broader at the middle, in proportion, and coalescent in *Roccus chrysops*.

There were said to be in one specimen sixteen, and in another, nineteen longitudinal dark lines. So large a number is rarely seen; the most constant arrangement is five above, including the one through which the lateral line runs, while sometimes there are several below the lateral line, and at other times they are obsolete. These lines are sometimes straight, but often interrupted.

In the "Fauna Boreali-Americana" of Richardson, a *Labrax* is described in the volume on Ichthyology, under the name of *Labrax notatus* (Smith), the Bar-fish or Canadian Basse." This species is said to "differ from Mitchell's Basse (*L. lineatus* Cuv.) in being much more robust, and in being marked with rows of spots, five above and five below the lateral line, so regularly interrupted and transposed as to appear like ancient church music." It has been suggested by Dr. Dekay that it is the same as the *Perca Mitchellii*, var. *interruptus* of Mitchell, but the comparison will apply very well to *Roccus chrysops*, and it is doubtless identical with that species. In the remarks upon the species, it is said—by Dr. Richardson apparently—that "in the more robust form, and in the strong scales of the head, the Canadian Bar-fish resembles the *L. mucronatus* of the United States and the West Indies, and the *L. multilineatus* of the Wabash. The latter has sixteen narrow, black, longitudinal lines on the flanks." It has been attempted to show that the number of lines is not a specific character, and if this is the case, the *Labrax notatus* and *L. multilineatus* are probably identical with each other and with *Roccus chrysops*. The *Labrax notatus*, it is true, is stated by Smith to have but one anal spine and six articulated ventral rays, but this statement is undoubtedly due to a *lapsus calami* or an error of observation. So great a variation, in the number of anal spines, from a nearly allied species, would be in direct opposition to all we know of the peculiarities of the fishes of this tribe, while it is one of the characters of the family to have only five branched rays in the ventral fins. Smith states that he counted fifty-eight scales along the lateral line, a statement which confirms the identity of this species with *Roccus chrysops*.

In the abstracts of Smith's description of *Labrax notatus*, given by Dekay
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and Storer, the species is said to have the "length, one to two feet." If this was so, it might militate against the idea of its identity with *Roccus chrysops*, but an examination of the description of Smith and Richardson reveals no mention whatever of the size of the species.

In the number of Guerin's "Revue et Magazin de Zoologie," for April, 1853, (vol. v. p. 164,) Professor Filippi, of Turin, has described a *Roccus* to which he has given the name of *Labrax Osculatii*, a traveller in America, M. Osculati, having obtained it from Lake Ontario. Filippi has distinguished this species from *Labrax lineatus* very well, alluding to the two longitudinal lines of basal teeth in that species, and attributing to his own a single oval patch. His other characters are the greater height of the body in *L. Osculatii*, which equals a third of the length, while in *L. lineatus* it is a

quarter; and the number of scales, which are formulated as $56 \frac{9}{15}$ for *L. Osculatii*, and $64 \frac{11}{15}$ for *L. lineatus*. The true teeth are also said to

be more numerous. The distinctive characters of the species are very well stated by Filippi, but his expression of surprise that a fish so common in the United States should not have been noticed by any American naturalist, not even by Dr. Dekay, is uncalled for. Unhappily, the species had been too often noticed, and in Dekay's Ichthyology of New York it appears under no less than three different names. Filippi has mentioned its habitat as the sea and rivers of the United States (*Mare et fluviis confederationis Americanæ*). I know not on what authority it is said to inhabit the sea; it is probably assumed to be found there because the *Roccus lineatus* is. So far as we now know, it is confined to the great fresh water lakes and the Western rivers.

Specimens of the *Roccus chrysops* are in the Museum of the Smithsonian Institution, from southern Illinois, obtained by Mr. Robert Kennicott, and from the Root river at Racine, Wisconsin, Toronto, &c., obtained by Professor Baird.

The specimens from the hydrographical basins of the Ohio river and of the Great Lakes cannot be specifically distinguished from each other. Nor can I perceive the difference signalized by Dr. Kirtland in the caudal fins of Ohio and Lake Erie specimens.

In extreme youth, this species appears to be crossed by obscure vertical bands; at a later epoch these bands are lost, and afterwards the longitudinal lines are assumed.

The best descriptions of this species have been published by Prof. Filippi under the name of *Labrax Osculatii*, and by the late Dr. Dekay under that of *Labrax albidus*. The best figure is that given by Dr. Kirtland in the Journal of the Boston Society of Natural History, but the dorsals are erroneously represented as being connected by a low membrane. In the text they are correctly described as being "distinct."

IV. MORONE. (Mitch.) Gill.

Synonymy.

Perca sp., Bloch, Gmel. Lac.

Morone sp., Mitchell.

Bodianus sp., Mitchell.

Labrax sp., Raf.

Corpus oblongo-ovatum, gibbosum ad pinnæ dorsalis initium. Dentes maxillares, palatini et vomerini velutini; dentes linguales in margine totio dispositi, ad basin carentes. Squamæ in capite totio bene pectinatæ. Preoperculum postice subtusque pectinatum. Operculum biaculeatum. Pinnæ dorsales ad basin membrana paulo elevata conjunctæ; pinna dorsalis spinosa radiis numero non decem superantibus. Pinna analis spinis tribus, quarum secunda sæpe major est. Linea lateralis antice convexa vix dorso concurrens.

1860.]

The chief distinctive characters of the genus are the presence of strongly pectinated scales on the cheeks and opercular bones, and the band of villiform teeth on the sides and of more scattered ones at the tip.

In the armature of the preoperculum and operculum, it resembles the genus *Roccus*. In the connection of the dorsal fins at the base, the less allied Pacific genera *Lateolabrax* of Bleeker, and *Psammoperca* of Richardson. The slightly gibbous back in front of the dorsal fin, and the greater development of the second anal spine are secondary features, which support the natural characters of *Morone* as distinguished from the genus *Roccus*.

For the name of the genus, one used by Mitchell for a group founded in error, has been adopted. The name of Mitchell resulted from a misunderstanding of that author regarding the value of the terms made use of by Linnaeus. The genus *Perca* was placed by the Swedish naturalist in his section of *Thoracici*; Mitchell, believing that the *Morone americana*, *Perca flavescens* and *Pomotis maculatus* were rather abdominal fishes, considered them to be generically distinct from *Perca*, and consequently gave to them the generic name of *Morone*. It is scarcely necessary to state that all the species enumerated have the normal position of the ventrals of *Perca*, and that therefore *Morone* of Mitchell was a mere synonyme of *Perca* of Linnaeus. I have nevertheless preferred to take that name rather than to give a new one.

Morone americana. Gill.

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Synonymy.

- Perca* Schoepff, Schrift. der Gesells. Nat. Freund, vol. viii. p. 159.
Perca americana Gmel., Systema Naturæ, vol. i., pars iii., p. 1308.
Perca Schoepff, Naturforscher, vol. xx., p. 17.
Perca americana Bloch, Systemæ Ichthyologiæ, Schneid. ed.
Perca americana Lac., Hist. Nat. des Poissons, vol. iv. p. 412.
Morone rufa Mitchell, Report in part on the Fishes of New York, p. 18.
Bodianus rufus Mitchell, Trans. Lit. and Phil. Soc. of New York, vol. i. p. 420, Jan. 1814.
Centropomus albus Raf. Precis des decouvertes Somilologiques, June, 1814. p. 19.
Perca mucronata Raf., American Monthly Magazine and Critical Review, vol. ii. p. 205.
Labrax mucronatus Cuv. and Val. Le petit Bar d'Amerique, Hist. Nat. des Poissons, vol. ii., p. 81, pl. 121.
Bodianus rufus Smith, Nat. Hist. Fishes of Mass, p. 274.
Labrax mucronatus Storer, Report on Ichthyology of Mass., p. 8.
Perca macronatus (misprint) Sw. Nat. Hist. of Fishes, Amphibians and Reptiles, vol. ii., p. 198. 1839.
Labrax rufus Dekay, Nat. Hist. of New York Fishes, p. 9, pl. 3, fig. 7.
Labrax mucronatus Ayres, Boston Journal Nat. Hist., vol. iv., p. 257.
Labrax mucronatus Linsley, Catalogue of Fishes of Connecticut.
Labrax rufus Storer, Synopsis of the Fishes of North America, p. 22; ib. in Memoirs of American Acad., new series, vol. ii., p. 274. 1846.
Labrax rufus Storer, Hist. of the Fishes of Mass., p. 1, ib. in Memoirs of American Acad., n. s., vol. v., p. 57.
Labrax mucronatus Baird, Report on Fishes of New Jersey Coast, p. 8; ib. in Ninth Annual Report of Smith. Inst. p. 322. 1855.
Labrax americanus Holbrook, Ichthyology of South Carolina, p. 21, pl. 3, fig. 2. 1855.
Labrax rufus Gill, Annual Report of Smith. Inst., p. 256. 1857.
Labrax mucronatus Hill, Catalogue of Fish of Jamaica, p. 1.
β.
Labrax nigricans Dekay, Nat. Hist. of New York Fishes, p. 12, pl. 50, fig. 160. 1842.

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Labrax nigricans Storer, Synopsis of the Fishes of North America; ib. in Memoirs of American Acad., vol. ii. p. 23. 1846.

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Morone pallida Mitchell, Report in part on the Fishes of New York, p. 18.

Bodianus pallidus Mitchell, Trans. Lit. and Phil. Soc. of New York, vol. i. p. 420.

Bodianus pallidus Smith, Nat. Hist. of Fishes of Mass. p. 294.

Labrax pallidus Dekay, Nat. Hist. of New York, Fishes, p. 11, pl. 1, fig. 2. 1842.

Labrax pallidus Storer, Synopsis of the Fishes of North America, p. 22; ib. in Memoirs of American Acad., vol. ii., p. 22.

Labrax pallidus Perley, Report upon the Fishes of the Bay of Fundy, p. 121. 1851.

Labrax pallidus Perley, Descriptive Catalogue (in part,) of Fishes of New Brunswick and Nova Scotia, p. 4; ib. in Reports on Sea and River Fisheries of New Brunswick, p. 182. 1852.

In the above synonymy, it will be observed that several species which have been created as distinct, and so retained by succeeding naturalists, have been merged into one. Although there can scarcely be a doubt of the identity of these nominal species, the synonymy, at the same time, has been divided into three portions, each applying to one of the nominal species as previously accepted.

The reference of all the variations of the *Labrax americanus* type to one species has been only done after a careful study of Dekay's descriptions, and after examination of numerous specimens of the genus. The descriptions of Dekay certainly do not afford any means for distinguishing his species, in the case of *Labrax rufus* and *Labrax nigricans*, except a very slight difference in the shade of color. The description of the color of the latter species is given by Dekay, as follows:

"The general hue is deep brownish-black, more intense on the head and upper part of the body. In the older specimens, there is a strong brassy hue throughout; occasionally dark longitudinal parallel streaks on the upper part of the body, pupils black, irides yellow, base of the fins light greenish-yellow, edge of the membrane of the spinous dorsal, black; upper portion of the membrane of the posterior dorsal fin transparent, and separated from the yellow portion at the base by a tolerably well defined dark band; membrane of the anal fin dark toward the tips of the rays."

Let any naturalist take an ordinary specimen of the common white perch, and decide whether the difference of color between that specimen and the *Labrax nigricans* is sufficient to authorize a separation on that ground; in all other respects, the description of Dr. Dekay will exactly apply to his *Labrax rufus*.

The distribution of the darker shades of color on the body and fins, is the same in both species; the proportions are the same, and the difference in the number of rays is not greater than is noticed in the same species. Is it not probable that Dr. Dekay was induced to separate the *Labrax nigricans* from his other species on account of a supposed difference of station? The *Labrax rufus* is described as being "obtained in brackish streams," while the *Labrax nigricans* is said to be found in "deep fresh-water ponds in Queen and Suffolk Counties." But the true *Labrax rufus* (*Morone americana*) is found also in streams of fresh water, and in ponds that are now entirely disconnected from the salt water, although not far from the sea. As there is therefore no difference in the habitation of the supposed two species, and as no specific distinctions appear to exist from the descriptions of Dr. Dekay, no alternative is left but to consider them identical.

Mr. William H. Herbert, a popular writer on our fishes, entertained "great doubts" whether the *Labrax nigricans* was more "than a casual variety of 1860.]

the Black Bass of the Saint Lawrence," the "*Grystes nigricans* of Agassiz." Such doubts deserve no consideration, as there are none of its being at least the congener of *Morone americana*.

As to the *Labrax pallidus*, there is a greater discrepancy in the description of it as compared with that of the *Labrax rufus*. It is said that in the former, the opercle has "a single flat spine, and a pointed membrane extending beyond it," while the generic characters given by Cuvier to the genus are retained, one of which is founded upon the presence of "two points on the opercle." The statement that *Labrax pallidus* has but one spine is probably due to a misapprehension of Dekay. In the *Morone americana* there is one acute point terminating the opercle, above which is an emargination separating it from a more obtuse or rounded process, which in one case has been regarded as a spine, and in the other has not. It is impossible to believe that two fishes of this genus so nearly resembling each other, should so differ in the development of the opercular spines.

Another distinctive character is said to exist in the first ray of the posterior dorsal, which is "nearly as long as the second." Was not this relative difference in the proportions of the rays the result of injury to the tips of the succeeding soft ones? As a third character, it is mentioned that the body is "much compressed." From the figures of *Labrax rufus* and *Labrax pallidus*, it would appear that any difference in height was rather in favor of the former than of the latter. No mention is made in the description, of the color of the fins of *Labrax pallidus*, but from the figure it would appear that the pattern is nearly the same in that species as in *Labrax rufus*, but the shade is lighter towards the borders of the dorsal and anal. This difference is too trivial to be accepted as specific, and if the above conjectures as to the nature of Dr. Dekay's statements are correct, the *Labrax pallidus* must be regarded as a mere synonyme of *Morone americana*.

Morone interrupta Gill.

Synonymy.

Labrax chrysops Girard. General Report upon the Zoology of the several Pacific Railroad routes, Ichthyology, p. 29.

non *Roccus chrysops* Gill.

The form of this species scarcely differs from the *Morone americana*, the chief difference existing in the more gradual declination of the dorsal outline to the end of the second dorsal fin, and the greater inequality of the anterior and posterior portions of the caudal peduncle. The greatest height of the body equals three-tenths of the length from the snout to the concave margin of the caudal fin; of that length, the head forms almost three-tenths, being not much less than the height of the body, and the caudal fin, at its middle rays, equals half of the height of the body. The caudal fin, when expanded, is emarginated and its angles rounded; the shortest rays equal three-fifths of the length of the longest.

The dorsal fin commences at a vertical intermediate between the bases of the pectoral and ventral fins, and is of a triangular form, the fourth ray being the largest, and equalling the length of the pectoral fin; the spines have the same form and arrangement as those of *Morone americana*. The second dorsal is connected by a membrane as in *Morone americana*; its spinous or first ray is little more than half the length of the first articulated one, which itself is nearly as long as the fourth dorsal spine; the fin thence decreases in height towards its last ray, which is shorter than its spinous one.

The anal fin commences under the fourth or fifth articulated ray of the second dorsal, and about four of its rays are posterior to the termination of that fin; the first spine is short and robust; the second at least twice as long as the first, compressed, and very strong; the third is as long or longer than the second, but much more slender. The first articulated ray of the anal is

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longer than the spines, and about twice as long as the last; the outline of the fin is slightly emarginated.

The first ray of the pectoral fin is, as usual, articulated but simple; the third is longest and branched, and equals the base of the second dorsal.

The ventrals are about as long as the pectorals; the length of the spine is equal to two-thirds of that of the first or second branched rays.

The radial formula is as follows:

D ix—I, 12; A iii, 10; C 4, I, 8, 7, I, 2; P 3, 14; V i, 5.

The scales are of about the same size as in the *Morone americana*, the lateral line running through about fifty, besides the smaller ones at the base of the caudal fin; at the region of its greatest height, there are about nineteen rows, of which about seven are above the lateral line and eleven beneath. The relative proportions on the different parts of the body are almost nearly the same as in that species, the chief difference existing on the front of the back, where the exposed portions of the disc are higher and narrower than in *M. americana*. On the cheeks from the orbit to the angles, there are about seven oblique rows.

The specimens preserved in spirits have a bright brazen color, tinged on the back with olivaceous. Along the sides are seven very distinct longitudinal black bands, through the fourth of which the lateral line runs for its entire length. The continuity of the bands below the lateral line is interrupted at the posterior half of their length, and they there alternate with their anterior parts.

The dorsal fins are tinged with purple, and the margin of the spinous one is dark. The anal is of a darker purple towards its anterior angle. The caudal, especially posteriorly and at its middle, is purple. The rays of the pectoral and ventral fins are yellowish, while the membrane of the former is hyaline, and of the latter sometimes minutely dotted.

This species, as will be observed by reference to the synonymy, has been described by Dr. Charles Girard, under the name of *Labrax chrysops* Grd. (*Perca* or *Lepibema chrysops* Raf.), to which is also referred as a synonyme, the *Labrax multilineatus* of Cuvier and Valenciennes, Kirtland, Dekay and Storer. From that species, it is very distinct, and even belongs to a different genus. Cuvier described the ground color as a greenish-gray on the back and silvery on the belly. This is not the color of *Morone interrupta*, and that species must be therefore distinct from *Labrax multilineatus*, nor can it be the *Perca chrysops* of Rafinesque, which is said to be "silvery with five longitudinal brownish stripes on each side," and have the "head brown above." This description, though erroneous in most respects, is as accurate as Rafinesque's generally are, and agrees sufficiently well with Kirtland's *Labrax multilineatus*, which is doubtless identical with the Cuvieran species. Even such an observer as Rafinesque would have noticed the deep brazen hue of *Morone interrupta*, and would not have overlooked two of the seven very distinct black bands that run along the sides.

Dr. Girard has stated that there are but six branchiostegal rays in his species, but I am able to say, from an examination of the specimens used by Dr. Girard himself, for description, that it agrees with all allied species, in having the normal number of seven, and which are developed as in *Morone americana*.

There are preserved in the Museum of the Smithsonian Institution, three specimens of the *Morone interrupta*, one of which was obtained by Lieutenant Couch, at New Orleans, and two larger ones were found at St. Louis, Missouri, by Dr. George Engelman. The small specimen from New Orleans differs from the two Missouri specimens by the larger second spine of the anal fin, but in every other respect they are similar.

Monograph of the *Philypni*.

BY THEO. GILL.

I. In the year 1837, M. Valenciennes has for the first time separated from the genus *Eleotris* of Gronovius, a fish which had been previously referred by Schneider, Lacepede and by Cuvier, to genera to which it did not naturally belong.

This species was first named *Platycephalus dormitator*, in Schneider's posthumous edition of the "Systema Ichthyologiæ" of Bloch, from the figure and manuscript description of the Father Plumier.

Shortly after, M. Lacepede, upon the same documents, established his *Gobiomorphus dormeur*. The genus to which it was referred was distinguished by M. Lacepede from the genus *Gobius*, by the separation of the ventral fins. The group was thus established on the same characters as those by which Cuvier afterwards separated the species under the Gronovian name of *Eleotris*, but the homogeneousness of the group was destroyed by the introduction of species which had no affinity to the *Eleotroids*.

Subsequently, Cuvier, in his "Regne Animal," revised the characters of the genus *Eleotris*, and introduced among true species of the genus, the *Eleotris dormitatrix*, which is the same as the above mentioned species of Bloch and of Lacepede.

No additional information was communicated respecting this species until the year 1837. At that time, M. de Valenciennes, in his monograph of the *Gobioids* contained in the twelfth volume of the "Histoire Naturelle des Poissons," revised the characters of the genus *Eleotris*, and in addition to those by which Cuvier distinguished it, referred to the presence of teeth only on the jaws. From the genus, as thus constituted, he has separated the *Platycephalus dormitator* of Schneider, or the *Eleotris dormitatrix* of Cuvier, on account of the presence of teeth on the front of the vomer. Valenciennes has taken the species as the type of a new genus, which he has called *Philypnus*, and the presence of vomerine teeth is the only character by which he distinguishes it from his *Eleotris*; he has called the species *Philypnus dormitator*, and has given an extended description of it. He had examined specimens from the islands of Martinique and Porto Rico, and has signaled its presence in Saint Domingo. The species thus described is the only one which he has referred to the genus.

But in the same volume as that in which he has introduced the genus *Philypnus*, Valenciennes has placed in the genus *Gobius*, a Chinese fish which Lacepede has described under the name of *Bostryche chinois*. This fish, as will afterwards be shown, is nearly allied to the species of the genus *Philypnus*.

II. The *Bostryche chinois* or *Bostrychus sinensis*, was first introduced into Systematic Nomenclature by Lacepede, who founded the species only on a Chinese drawing. The genus *Bostrychus* was formed for its reception, and was characterized by its "elongated and serpentiform body, two dorsal fins, the second of which is separated from the caudal fin, two barbels at the upper jaw, and the eyes quite large and without a lid." As a second species of the genus so defined, Lacepede has placed a species which was ascertained by Valenciennes to be a species of *Ophicephalus*, a genus belonging to an entirely different family from the *Bostrychus sinensis*, and which possesses a single long continuous dorsal. Notwithstanding this rather important variation from *Bostrychus sinensis*, Lacepede chiefly distinguishes his second species by a difference of color, the former being described as brown, and the latter as spotted with green; from the latter character the name of *B. maculatus* was conferred on it. The *B. maculatus*, like the *B. sinensis*, was only known from a Chinese drawing. As Valenciennes has

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already remarked, it should properly have been referred by Lacepede to his genus *Bostrychoides*, which was distinguished from his *Bostrychus* by the presence of only one dorsal fin.

In 1806, M. Dumeril published his "Zoologie Analytique, ou Methode Naturelle de Classification des Animaux." In the ichthyological portion of the volume, the genera of Lacepede are adopted, but the name of *Bostrychus* is abolished on account of its previous application by Geoffrey to a genus of coleopterous insects, and that of *Bostrichtes* or *Bostrichthys* is substituted in its stead. The characters given to the genus are the same as those of Lacepede.

In 1815, Rafinesque published his "Analyse de la Nature, ou Tableau de l'Univers." In this volume there is first introduced into the seventh family of the system (*Petalomia*,) and into the first sub-family (*Cepolidia*) the *Bostrychus* of Lacepede under the name of *Bostrictis*, and the *Bostrychoides* under the name of *Pterops*, and these are interposed between *Cepola* and *Trachypterus* on the one hand, and on the other *Tasica* Raf., and *Lepodopus*, while *Gymnetrus* and a number of genera founded on more or less perfect specimens of *Trachypterus* are placed in a second family called *Gymnetria*. Again the *Bostrychi* and *Bostrychoides* are introduced under the new name of *Ictiopogon* for *Bostrychus*, and *Pterops* for *Bostrychoides* into a twenty-third family called *Pantopteria*, and into a third sub-family (*Anguillina*). The family and sub-families contain a singular and most unnatural reunion of the most widely distinct types; apodal *Scombroids* and *Xiphioids* are mingled with apodal *Blennoids* and *Comephorus* and *Mastacembelus* Gron, *Ammodytes* L., *Ophidium* L., and *Anguilla* are thrown together in the same family. Rafinesque doubtless derived the idea of placing the last named genera in the family of "*Pantopteria*" or apodal fishes from a remark of Lacepede, who saw no ventrals represented in the figures of his *Bostrychi*, and therefore suggested that none might exist.

Thus, on the authority of the figure of a Chinese painter, unacquainted with Ichthyology, three distinct generic names, besides orthographical modifications of two of them, had been formed for a fish which no naturalist had ever seen. Without criticism and without judgment, it had been referred to the systems of the various authors, and one of them had placed it in two distinct orders in the same work. After the last of these works, the problematical genus was allowed to rest, and no naturalist has since paid attention to it.

The first critical ichthyologist who examined the grounds on which the species was founded, was M. Valenciennes. That excellent naturalist, like his predecessors, only knew the species by the Chinese painting. Judging from this alone, he recognized its affinity to the Gobioids, and expressed the belief, from its form, that it was certainly a *Gobius*, and therefore called it *Gobius sinensis*, but was careful to observe that he could neither see the ventral fins, nor count the rays of the others.

The first ichthyologist by whom the species was seen and described from nature was Sir John Richardson. That gentlemen, in the Ichthyology of the Voyage of H. M. S. the Sulphur, gave a description of it, referring it, as a new species, to the genus *Philypnus*, under the name of *P. ocellicauda*. He afterwards, in the same work, published his belief of its identity with the *Bostrychus sinensis* of Lacepede, and adopting the specific name of that author, called it *Philypnus sinensis*. In the same part, he has given a very good figure of the species.

Subsequently, Dr. Bleeker, in his monograph of the Gobioids and Blennoids of the Sundamallucan Archipelago, described a fish, which he called *Philypnus ophicephalus*, at the same time doubtfully placing as a synonyme, the *Philypnus ocellicauda* of Richardson. He afterwards appeared to have become satisfied of the identity of the two species, and adopting the older name of Richardson, quoted his own as a synonyme.

Although this species is nearly allied to the true *Philypni*, it differs too much from those species to be a natural member of the same genus. It has therefore

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been now placed in a separate one, for which the name of *Bostrichthys* is retained. The two genera, *Philypnus* and *Bostrichthys*, form a distinct group, characterized chiefly by the presence of vomerine teeth. To this group, the name of *Philypni* may be given : ultimately it may be found to be a separate sub-family.

PHILYPNI Gill.

The form of the body is similar to that of the typical Eleotroids, anteriorly subcylindrical, becoming compressed, and slightly decreasing in height towards the caudal fin.

The head is elongated and depressed above, the mouth ample, the teeth villiform on both the jaws and the front of the vomer.

The branchial apertures are more or less extended forwards, but separated from each other by an isthmus.

There are six branchiostegal rays, the four exterior of which are well developed, curved and compressed, the two internal are small and slender.

The dorsal fins are separated by a considerable interval ; the ventrals approximated, but entirely disconnected.

The above characters apply to the only two known genera. Subsequent discoveries may necessitate their revision. The group as thus constituted, differs from the Eleotroids by the presence of vomerine teeth, and the distance of the dorsal fins from each other. If these characters are persistent, it would seem proper to retain the group as a distinct sub-family.

The only known genera are *Philypnus* Val., and *Bostrichthys*. *Philypnus* is an American form, and *Bostrichthys* an Asiatic form. The characters of these will be now given :

PHILYPNUS Val.

Synonymy.

Philypnus Val., Hist. Nat. des Poissons, vol. xii. p. 255, 1837.

Platycephalus sp. Bl. Schneid., Systema Ichthyologiæ, 1801.

Gobiomorus sp. Lac., Hist. Nat. des Poissons.

Eleotris sp. Cuv., Règne Animal, ed. ii.

Head elongated, subconical in profile, depressed above ; mouth large, lower jaw projecting beyond the upper ; nostrils with raised margins, between the eyes and upper jaw ; the distance between each nearly equal to that of the anterior nostrils from the upper jaw, and of the posterior from the eyes. Branchial apertures extending anteriorly nearly to the angles of the mouth and separated from each other by a very narrow isthmus. Scales ctenoid, moderate, extending on the forehead, opercula and cheeks ; pectinations of those on the forehead and cheeks frequently obsolete.

All of the scales on the body of the species of *Philypnus* are more or less angulated posteriorly, and have the nucleus near the angle ; from this angle radiating grooves and ridges diverge towards the anterior margin of the scales, and are crossed by concentric striæ, which terminate at the posterior borders in pectinations that are often obsolete ; in other scales, especially on the forehead, the concentric striæ surround a subcentral nucleus, and give to the scales a pseudocycloid appearance. In young individuals the scales are much more distinctly pectinated than in the adult.

Philypnus dormitator Val.

Synonymy.

Cephalus seu asellus palustris, vulgo le dormeur, Plummer, MSS. fide Val.

Platycephalus dormitator Bloch, Systemæ Ichthyologiæ, ed. Schneid.

Gobiomorus dormeur Lacepede, Hist. Nat. des Poissons, vol. ii. p. 599.

Gobiomorus dormeur Descourtilz, Voyages d'un Naturaliste.

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Eleotris dormitatrix Cuv., Regne Animal, vol. ii.

Eleotris dormitatrix Guérin, Iconographie du Regne Animal.

Philypnus dormitator Val., Hist. Nat. des Poissons, vol. xii. p. 255.

Philypnus dormitator Storer, Synopsis Fishes of North America, ib. in Memoirs of American Acad., vol. ii.

Philypnus dormitator Girard, United States and Mexican Boundary Survey, Ichthyology, p. 29, pl. xii. fig. 13.

This species has been very fully described by Valenciennes. He had examined specimens from Porto Rico, St. Domingo and Martinique. It has also been found at Mexico.

Dr. Girard has given a figure of a very small species of this genus under the name of *Philypnus dormitator*. It is very probable the young of that species, but as the only specimen in the Museum is one of fifteen inches in length, obtained by the author at the junction of the Arouca and Caroni rivers, in the island of Trinidad, there is no means of comparison. The specimen described by Dr. Girard has very large eyes, and other characters of an extremely young fish. It was obtained at the mouth of the Rio Grande by Mr. John H. Clarke, the Naturalist of the "United States and Mexican Boundary Survey," and is preserved in the Smithsonian Museum.

Philypnus lateralis Gill.

In general outline of form, this species has considerable resemblance to the *Philypnus dormitator*. The dorsal outline ascends in almost a straight line from the snout to the front of the dorsal fin, the chief variation existing between the eyes, where there is a slight depression. The back under the first dorsal is straight; at the second, it declines very little and in almost a straight line to the base of the caudal fin. The abdominal outline from the ventrals to the caudal fin converges in nearly the same proportion as the dorsal. The greatest height of the body, at the first dorsal ray, is equal to about one-fifth of the total length, inclusive of the head and caudal fin; the least height at the base of the caudal is half of the greatest.

The head, in profile, is conical or elongated triangular; it forms three-tenths of the total length. Its dorsal and inferior surfaces regularly converge towards the tip of the lower jaw, and the declension of the former is about twice as great as the ascension of the latter. The dorsal surface over the operculum is rounded, and the degree of convexity becomes less towards the eyes, between which it is flat. The breadth at the operculum equals about half the length of the head, and under the eyes it is between one-fourth and one-fifth less. The interocular space is somewhat less than half of the breadth at the opercula. The outlines of the jaws are semi-elliptical.

The eyes are longitudinally oval, and are at the third sixth of the head's length.

The preoperculum in its declination recedes considerably backwards, and is thence broadly curved forwards. The distance from the orbit to the preopercular angle, equals the distance from the posterior border of the orbit to its horizon behind the intermaxillaries. The operculum declines obliquely downwards from its membranous point, and its greatest length, in an oblique direction, slightly surpasses the interval between the orbit and the angle of the preoperculum. The oculo-humeral groove is shallow and scarcely ascending.

The mouth is oblique and large, the maxillaries extending backwards to the vertical of the eyes.

The teeth on the jaws do not much differ from those of the *Philypnus dormitator*. The vomerine patch is narrowed towards its ends, and its teeth are much smaller than those of the jaws, especially anteriorly.

The scales on the sides of the body are of an oblong form and hexagonal outline, with the nucleus at the posterior angle and with about eight radiating

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ridges, some of which are bifurcate; the ridges are separated into two portions by the median line. The free margin is delicately pectinated. The scales are of moderate size, there being about fifty-four in a row behind the pectoral fins. Before the dorsal fin, and especially on the forehead, the nucleus is subcentral, and with numerous radiating grooves sometimes advancing even to the lateral margins. On the operculum they are often higher than wide, with the nucleus subterminal to subcentral, with the posterior margin angulated and pectiniform; on the preoperculum they are smaller and almost square, with more or less subcentral nuclei, and with the pectinations generally obsolete.

The first dorsal fin commences some distance behind the vertical of the bases of the pectorals, and has the arrangement of the rays normal in the *Gobionæ* and *Eleotrinæ*. The rays in length have the following relation to each other; 2, 3, 1, 4. The second dorsal is oblong and commences behind the vertical of the anus.

The caudal fin is posteriorly rounded, and its longest rays form a fifth of the length of the fish.

The pectorals are rounded and equal in length to the interval between the orbit and the margin of the operculum. The ventrals are also rounded, and the third and fourth branched rays are the longest.

The radial formula is as follows:—

$$\begin{array}{ccccccc} & 1 & & 1 & & & \\ \text{D vi} & -\text{I}, 8 & - & \text{A I}, 1, 8 & - & \text{C 5}, 6, 5, 5 & ; \text{P 2}, 13 & ; \text{V I}, 5. \\ & 1 & & 1 & & & \end{array}$$

The color is dark purplish brown, lighter on the abdomen. Along the sides a black band runs from behind the upper part of the pectoral to the base of the caudal fin, dividing about nine vertical light bands, which project a little above and below the band. At the base of the caudal, the lateral band somewhat enlarges, and is sometimes partly surrounded by a light margin. The vertical and ventral fins are sometimes immaculate, but generally spotted with white and black. The pectorals have a black spot at the upper axilla, and a blackish basal band, bordered on each side by whitish. The head is of the color of the back, with vertical dark bar from the eye to the angle of the jaw, another from the inferior corner of the eye to the extremity of the operculum, and another horizontal one from the orbit to the upper jaw.

This species was obtained in considerable numbers by Mr. John Xantus, of the United States Coast Survey, at Cape St. Lucas, Lower California. It adds another proof of the similarity of the Fauna of the Gulf of California to that of the West Indies.

The specimens collected by Mr. Xantus are in the Museum of the Smithsonian Institution, and are numbered in the catalogue of the Ichthyological collection from number 2435 to 2442.

This species differs from its West Indian congener chiefly in its proportions, the smaller vomerine band of teeth and in color.

BOSTRICHTHYS (Dum.) Gill.

Synonymy.

<i>Bostryches</i>	}	Lacepede, Hist. Nat. des Poissons, vol. iii. p. 141.
<i>Bostrychus</i>		
<i>Bostrichtes</i>	}	Dum., Zoologie Analytique, &c., p. 120, 1806.
<i>Bostrichthys</i>		
<i>Bostrictis</i>	}	Raf., Analyse de la Nature, &c., 1815.
<i>Ictiopogon</i>		
<i>Philypnus</i> sp. Rich.		

Head elongated subconical in profile, oblong and depressed above. Nostrils distant: the anterior elongated-tubular, and immediately behind the maxil-

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laries; the posterior subtubular and immediately in front of the antero-superior border of the eye. Branchial apertures extending forwards considerably beyond the posterior margins of the preopercles, and separated from each other by a wide isthmus. Scales cycloid, small, especially anteriorly, and extending on the opercula, cheeks and forehead.

The name of *Bostrychus*, which was applied to this genus by Lacepede, had been previously used by Geoffrey, who, in the year 1764, applied the name, incorrectly spelled *Bostrichus*, to a genus of coleopterous insects. The name applied to that group has been universally adopted by Entomologists, and the name of *Bostrychus*, as applied to the piscine genus, must be replaced by another. The name of *Bostrichthys* was proposed as a substitute by Mr. Dumeril, and this is accepted.

It would be questionable to some whether a genus founded on the evidence that *Bostrychus* was by Lacepede, and founded, at the same time, on erroneous ideas, should be adopted. Bleeker has adopted Richardson's first specific name, and on the same principle, the generic name of Lacepede would also have been probably ignored by him. The same objections that exist against Lacepede's name would, of course, militate against the adoption of those of Dumeril and Rafinesque, which were only intended by their authors to supersede his. Believing, however, that the laws of priority are imperative, and require the adoption of the first given name, when the object to which it was given can be identified, and unless entirely founded on false characters, the name of *Bostrichthys* is now accepted. Against the name, however, there exist the objections of an erroneous formation, and of a reference to a false character. The name, in accordance with the composition, should be written *Bostrychichthys*, but the erroneous name is more euphonious than the correct one. The name itself would imply the presence of cirrhi or barbels, but none exist; the objects that were taken for such by Lacepede are the prolonged nasal tubes. These objections do not appear to be of sufficient weight to authorize a change of name.

The zoological characters by which *Bostrichthys* is distinguished from *Philypnus* are found chiefly in the difference of the extent of the branchial apertures, the cycloid structure of the scales, the distant nasal apertures, and the tubular form of the anterior ones. The smaller size of the scales, especially on the anterior portion of the back, where they are imbedded in the skin, perhaps offers another distinguishing character of *Bostrichthys*.

Bostrichthys sinensis Gill.

Synonymy.

- | | | |
|--|---|--|
| <i>Bostryche chinensis</i> | } | Lacepede, Hist. Nat. des Poissons, vol. iii. p. 141. |
| <i>Bostrychus sinensis</i> | | |
| <i>Le Gobie chinensis</i> | } | Val., Hist. Nat. des Poissons, vol. xii. p. 94. |
| <i>Gobius sinensis</i> | | |
| <i>Philypnus ocellicauda</i> Rich., Voyage of the Sulphur, Zoology, p. 59. | | |
| <i>Philypnus sinensis</i> Rich., loc. cit., p. 149, pl. 56, fig. 15, 16. | | |
| <i>Philypnus sinensis</i> Rich., Fifteenth Annual Report of the British Association A. S., p. 210. | | |
| <i>Philypnus ophicephalus</i> Blkr., Verhandelingen v. Batav. Genootschap, vol. xxii., Blennoiden en Gobioïden, p. 20. | | |
| <i>Philypnus ocellicauda</i> Blkr., Verhandelingen v. Batav. Genootschap, vol. xxvi., Index sp. Piscium, p. 10. | | |

There can scarcely be a doubt that this is the *Bostrychus sinensis* of Lacepede, as there is no other fish of the Chinese waters known which has any thing like "two barbels at the upper jaw," and an ocellus near the dorsal region of the peduncle. The first specific name, *P. ocellicauda*, which has 1860.]

been proposed by Richardson, and adopted by Bleeker, must therefore be relinquished for the prior one of Lacepede.

As this species has been fully described by Richardson and Bleeker, and also figured by the former, no further description is necessary, this being the only known species of the genus.

Specimens have been obtained by Dr. William Stimpson, the Naturalist of the North Pacific Exploring Expedition, under Commodore Rodgers, at the market of Hong Kong, China.

Notice of Geological Discoveries, made by Capt. J. H. Simpson, Topographical Engineers, U. S. Army, in his recent Explorations across the Continent.

Washington City, April 9th, 1860.

Anticipatory of discoveries of a geological character which might be made and published of date subsequent to those of my Explorations, in 1858 and '59, across the Continent, with the sanction of the Hon. John B. Floyd, Secretary of War, under whose authority the Explorations were made, I present in advance of my final and detailed official report, the following communication from Messrs. F. B. Meek and H. Engelmann, in reference to the fossil remains which they found, and the geological epochs to which they point. As a large portion relates to a region of country, *The Great Basin*,—so called by Fremont—lying between the Wahsatch range of mountains on its east, and the Sierra Nevada on its west, which never before was traversed by a white man, not even by a trapper, so far as is known, the publication of this paper cannot be unacceptable to the scientific world, and I therefore take pleasure in submitting it to be read before the Academy.

J. H. SIMPSON,

Capt. Top. Engineers, U. S. Army.

SMITHSONIAN INSTITUTION, }
Washington, D. C., April 2d, 1860. }

Capt. J. H. Simpson, Topographical Engineers, U. S. Army:

Dear Sir,—In accordance with your instructions we give below a brief statement of some of the conclusions arrived at from a hasty examination of the fossils collected during your late explorations in Utah. Although the time yet devoted to the study of these specimens is not sufficient to enable us to enter into details, enough has been determined to warrant the conclusion that they are of considerable interest, and establish the existence there of geological formations not hitherto known at such remote western localities.

As a more extended sketch of the general geology of the country, including a full account of the igneous and metamorphic rocks, together with figures and descriptions of the new organic remains, are to appear in your final report, it is unnecessary for us to do more here than to give merely some of the leading facts determined from the fossils collected from the various formations exposed along the line of survey. In doing this it will be most convenient to speak of the formations in the order of their succession in point of time, beginning with the most ancient, instead of referring to them in the order in which they were observed in traversing the country.

DEVONIAN ROCKS.

The oldest deposits from which fossils in a condition to be determined were collected, occur in the vicinity of the Humboldt Mountains, at the following points, viz.: Long. 114° 45' west, Lat. 39° 45' north,—Long. 115° 58' west, Lat. 39° 33' north, and Long. 115° 36' west, Lat. 39° 30' north. At the first of these localities fragments of *Trilobites* belonging as near as can be determined to the genera *Calymene*, *Homalonotus* and *Proetus*, were collected from a hard, bluish limestone. The specimens are too imperfect to warrant a posi-

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tive opinion whether they are Upper Silurian or Devonian forms, though they evidently belong to one or the other of these epochs, and closely resemble Hamilton Group forms.

At the other localities mentioned above, a group of fossils of decided Devonian type were found. They consist of *Atrypa reticularis*, *A. aspera*, or a closely allied species, a small *Productus*, and three new species of *Spirifer*. The first of these species has so great a vertical range, that taken alone, it would only indicate that the rock from which it was obtained holds a position somewhere between the Upper Silurian and the middle or higher portions of the Devonian. *A. aspera* is a common Devonian fossil, but is also said to occur in the upper Silurian of the old world while the genus *Productus* is now generally regarded as not dating farther back than the Devonian.* These facts taken in connection with the close analogy of the small *Productus* mentioned above, and the associated *Spirifers*, to forms characterizing the Hamilton Group of the New York Devonian series, leave little room to doubt that the rock in which these fossils were found is of Devonian age, and that it most probably belongs to about the horizon of the Hamilton Group.

The discovery of these fossils at this distant locality cannot fail to be regarded as an interesting addition to our knowledge of the geology of the great West, especially when it is borne in mind that they were obtained near twelve hundred miles farther westward than such forms, so far as is known to us, have hitherto been found *in situ*, within the limits of the territory of the United States.†

CARBONIFEROUS ROCKS.

Following up the sequence of the formations, we pass eastward to the vicinity of Camp Floyd, which is in Long. 112° 8' west, Lat. 40° 13' north. Here on the west side of Lake Utah, extensive deposits of a dark, very hard, silicious limestone of Carboniferous age occur. The fossils collected from these beds here, and for a long distance west of this, are in so bad a state of preservation that the specific characters of most of them are much obscured. It is believed, however, that we have from this rock *Orthis Michelini*, and *O. umbraculum*, though they may be only allied representative species. There are also along with these a species of *Arthyris* or *Terebratula*, one or two of *Spirifer*, and the spiral axis of an *Archimedes*,‡ with fragments of other *Polyzoa* and *Corals*.

As the genus, or subgenus *Archimedes*, has not yet, so far as we know, been found as high in the Carboniferous system as the Coal Measures, and there are apparently no decided Coal Measure forms in the collections from this rock, we are inclined to regard it as belonging to the Lower Carboniferous series.

Carboniferous formations also extend westward from Camp Floyd to the

* Some two or three species were formerly supposed to occur in the Upper Silurian rocks of the Old World, but the correctness of this conclusion is questioned by most of the best English and Continental authorities.

† A few fossils belonging to the genera *Spirifer*, *Conocardium*, &c., collected on a former expedition by one of the writers (H. E.) near Medicine Bow Butte, Long. 106° 30' west, Lat. 41° 38' north, were regarded by Dr. Shumard as probably of Devonian age, though none of the species were positively identified with Devonian forms, and they were obtained from an erratic mass, the exact original position of which is unknown.

‡ It is also stated in Capt. Stansbury's report that at a locality three or four days' march beyond Fort Laramie, an outcrop from which some imperfect specimens of gasteropoda and a shell resembling a *Monotis* were obtained, is probably of Devonian age. The exposure here alluded to, however, is now known to be composed of Jurassic and probably Triassic rocks. The genus *Monotis* is unknown below the upper Coal Measures, in this country, and the Permian in the Old World, though it ranges above on both sides of the Atlantic.

§ We believe this to be the first specimen of this curious fossil yet found in the region of the Rocky Mountains.

Devonian localities alluded to above, interrupted at places by outbursts of igneous rocks. It is likewise probable there may be in this interval both Devonian and Silurian strata, but the collections yet obtained are not sufficient to enable us to speak with confidence on this point.

Between Long. 115° and $115^{\circ} 30'$, Lat. $40^{\circ} 10'$ and Lat. $39^{\circ} 20'$, there is a series of hills or mountains, trending nearly north and south, to unknown distances beyond the field of these explorations, which seem to be mainly made up of light yellowish gray, more or less argillaceous, and arenaceous subcrystalline limestones, and slates. This formation belongs to the Carboniferous system, but is more recent than the dark colored limestone at Camp Floyd. The fossils collected from it are for the most part new, and consist of three species of *Productus*, one of which resembles *P. Rogersi*, Norwood and Pratten, two new species of *Spirifer*, and another apparently identical with *S. cameratus*, but more robust, and having stronger costæ than is common in that species. Along with these there are also specimens of *Athyris subtilita*, and a new species of *Chonetes*, closely allied to *C. Verneuiliana*, Norwood and Pratten, from the Western Coal Measures. From the affinities of this group of fossils, we have little hesitation in referring this rock to the Upper Carboniferous series, though in its lithological characters it is entirely unlike strata of that age in the Middle and Western States.

There were also seen at a few places near here, some outcrops of dark grayish colored limestones, containing *Productus*, *Spirifer*, &c. These were not observed in contact with the light colored beds mentioned above, but under circumstances indicating that they hold a lower position, from which it is inferred they are probably of lower carboniferous age.

The occurrence here, as far west as Long. 115° , of extensive Carboniferous formations, is another interesting fact in the geology of this distant region not known previous to these explorations,—no rocks of this age being represented on any of the most recent and carefully compiled geological maps, from near Camp Floyd and the Salt Lake to the Pacific Ocean.

Deposits, probably of the age of the Coal Measures and of great thickness, were also observed in the Wahsatch Mountains east of Lake Utah, along Timpanogos Cañon. The strata here, however, consist mainly of dark colored and bluish impure limestones, slates, and argillaceous shales, the latter containing at a few places fragments of carbonaceous matter,—the whole being upheaved and greatly distorted, apparently by violent forces acting from beneath. The fossils collected from these beds all differ specifically from those found in the light colored limestone at the localities near Long. 115° west, and we have no means of determining which of these is the older rock. The specimens from the dark colored beds in the Cañon, consist of one new or undetermined *Spirifer*, two of *Productus*, and two of *Athyris*, together with fragments of a small *Lepidodendron*.

The indications of Coal of true Carboniferous date, seem to be more favorable here than at any other point examined along the route explored, though no beds of it were seen. Good coal has, however, been found in the same mountain range 140 miles south of this, but as yet little is positively known in regard to its age.

Several miles above this on Timpanogos River, and at a higher geological horizon, outcrops of light colored, and yellowish sandstones and silicious limestones, with red shales, were seen. At one place in this formation a few specimens of very hard, light gray, highly silicious rock were obtained, containing great numbers of small bivalves, in a broken condition. As near as could be determined these are very much like *Bakevellias*, while another of these specimens contains a fragment resembling closely a *Phyllipora*. Both these fossils are quite similar to Permian forms, but it would be unsafe without other evidence to refer the rock to that epoch.

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TRIASSIC ROCKS.

At several localities east of Lake Utah, near the tributaries of Uintah River, extensive deposits of fine red, more or less arenaceous material were seen occupying considerable areas, and from the accounts of various explorers, this formation is greatly developed along the Wahsatch Mountains south of Lake Utah. At these latter localities we have accounts of numerous beds of gypsum, and deposits of rock salt. These beds were seen near Uintah River are not known to contain gypsum or salt, but from the occurrence of gypsum in similar formations a little farther south, and their proximity and relations to Jurassic strata to be mentioned hereafter, there is little room for doubting that they are the same red gypsum-bearing deposit seen by Dr. Hayden beneath Jurassic rocks at the Black Hills. (See paper by Meek & Hayden, *Proceed. Acad. Nat. Sci., Phil'a*, March, 1858, p. 44.)

From the statement of Mr. Marcon, Dr. George Shumard, Mr. Blake, and more recently of Dr. J. S. Newberry, it is evident this formation is developed on a grand scale in New Mexico. The only organic remains yet found in it, so far as we know, were some plants (*Zamites*, *Pterophyllum*, &c.) and Saurian bones, discovered by Dr. Newberry during his important investigations in the South-West, as geologist of the exploring expeditions under the command of Lieut. Ives, in 1858, and Capt. McComb, Top. Engrs., U. S. Army, in 1859. These fossils led Dr. N. to refer this series to the New Red or Triassic epoch,* which view was also maintained by Mr. Marcon, though the latter gentleman seems not to have had a very clear idea of its limits, since he included other rocks in the Trias as defined by him.

This formation is well exposed on the North Platte at Red Butte, above Fort Laramie, where it also contains several beds of gypsum, and again on La-Bonte Creek, nearer Fort Laramie. It likewise occurs on Smoky Hill River, and at other localities in Kansas, where it has been referred (along with some lower Cretaceous rocks, and possibly some Jurassic strata) to the Trias, by Mr. F. Hawn. All the facts that have been accumulating for some time past, seem to render it more than probable that this series really represents the Trias of the Old World.

JURASSIC ROCKS.

At the localities already mentioned where the red beds were seen near Duchesne River, a tributary of Uintah River, heavy deposits were also observed of grayish and whitish calcareous rock, and light, red and whitish sandstones and shales. Some portions of the same formation were also met with further to the north-west on the east branch of Weber River. At both of these places in the calcareous beds, fragments of *Pecten*, *Ostrea* and portions of the columns of *Pentacrinus*, undistinguishable from those of the Jurassic species *P. asteriscus*, Meek and Hayden, were found. From the presence of these fossils, taken together with all the other circumstances, we have scarcely room to doubt that these deposits are of Jurassic age.

Well marked Jurassic strata occur at Red Buttes, on the North Platte,—at the same locality already referred to in speaking of the red gypsum bearing rocks. They were not seen in direct contact with the gypsum formations, but under circumstances showing that they must hold a higher stratigraphical position. Here they consist of sandstones, shales and slates, more or less laminated calcareous sandstones, and gritty limestones of various colors, altogether of considerable thickness. Some of the lower of these beds are quite fossiliferous. The specimens collected consist of *Pentacrinus asteriscus*, Meek and Hayden, a *Gryphæa* probably identical with *G. calceola*, Quenstedt, a plicated oyster,

*See Am. Journ., vol. 28, 2d ser., p. 299:

closely allied to *O. Marshii*,* a *Pecten* scarcely distinguishable from *P. lens* of Sowerby, a small *Dentalium*, and *Belemnites densus*, Meek and Hayden. From the identity of some of these species with forms collected by Dr. Hayden at the Black Hills, from beds overlying the red gypsum bearing strata of that region, and associated with other well marked Jurassic types, as well as from the affinities of the new species discovered at the locality under consideration on the North Platte, we have no hesitation in referring these deposits to the Jurassic system, in accordance with the views of Dr. Hayden and one of the writers (F. B. M.) expressed in regard to the beds alluded to at the Black Hills. (See Proceed. Acad. Nat. Sci., Philad'a, March, 1858.)

CRETACEOUS ROCKS.

Returning south-westward again to Weber river, in order to follow up the succession of the formations, we find that at a point nearly due east of Salt Lake City, on that stream, and but a short distance north of the locality, where it has already been mentioned that Jurassic beds with *Pentacrinus* occur, outcrops of a Whitish Sandstone were seen, containing in an imperfect condition an Oyster, agreeing in all respects, as far as could be determined, with *O. glabra* of Meek and Hayden. This rock, with the same oyster, was also seen some eight or nine miles farther down Weber River; also, on White Clay Creek, a tributary of Weber River, and some fifty miles farther east on Sulphur Creek, a tributary of Bear River. At the latter locality a small *Anomia* was also found with the same Oyster; and in a more yellowish portion of the same formation several specimens of *Inoceramus*, closely allied to the Western species usually referred to *I. problematicus*. Judging from the Oyster occurring in this rock, and from its lithological characters, it would seem to be of the same age as some older Cretaceous strata, at the mouth of Judith River, on the Upper Missouri, which have been referred by Dr. Hayden and one of the writers, provisionally to No. 1, of the Nebraska section.

At several of the localities rather extensive beds of excellent brown coal, with some shale, were seen in immediate contact with this Oyster Sandstone, and apparently dipping at the same angle, so as to give the impression, when examined, that it belongs to the same epoch.

Well marked Cretaceous rocks were seen at a point on the Platte below the Red Buttes, near the Platte Bridge. The beds consist of gray shales and slates. The fossils found here are a large new species of *Inoceramus*, a fragment of a much compressed *Baculite* and *Ostrea congesta* of Conrad. From the presence of the latter fossil, it is more than probable these beds are on a parallel with No. 2 or 3 of the Nebraska Cretaceous series.

TERTIARY ROCKS.

Tertiary formations occur over a large area in the region of Fort Bridger. They seem to belong to two distinct epochs, the older of which was seen on Bear River, near the mouth of Sulphur Creek, about 30 miles west of Fort Bridger, and but a short distance from the locality, already mentioned, where the *Oyster* and *Inoceramus* occur in a yellow sandstone. The outcrop seen here consists of light colored and gray argillaceous shale, with coarse dark and light colored limestones, all of which dip at a high angle. The fossils collected from these beds consist of one new species of *Unio*, three of *Corbula* (*Potamomya*), three species of *Melania*, three or four of *Faludina*, and one of *Melampus*.

This is an exceedingly interesting deposit, which is undoubtedly of brackish-water origin, the fossils belonging to just such a group of genera as we would expect to find in an estuary deposit, without any strictly marine forms. One

*The oyster here alluded to, is distinct from the species referred by Mr. Marcon to *O. Marshii*. The *O. Marshii* of Marcon holds a much higher stratigraphic position than the above mentioned species.

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of the species of *Melania* appears to be identical with *Cerithium tenerum* of Hall, (Fremont's Report, pl. 3, fig. 6,) and a small *Paludina* agrees very closely with *Natica? accidentalis*, while a third is equally as near *Turbo paludinaformis*, of the same report. All the other species are new excepting one *Paludina*, which is identical with *P. Conradi* of Meek and Hayden, from the estuary beds at the mouth of Judith River, on the Upper Missouri. All the facts point to the conclusion that this formation holds a low position in the Tertiary System, or, in other words, is probably of Eocene age.

The succeeding more recent Tertiary beds of this region, are extensively developed along the route traversed, from near the last mentioned locality to Fort Bridger, and thence towards the South Pass. They differ materially in their lithological character from the older deposits just described, and are characterized by an entirely different group of fossils. The upper part of this series consists of greenish sandstones and arenaceous shales, interstratified with sandy and calcareous slates altogether estimated at from two to three hundred feet in thickness, and apparently destitute of fossils. Then comes, (descending,) light colored argillaceous and pure limestones, with at places great numbers of fossils, all of which are strictly fresh water forms, belonging to a few species. Those collected consist of two new species of *Melania*, two of *Limnea*, one of *Unio* and two or three of *Planorbis*. There is also at the junction of the lower light colored more calcareous deposits with those above, at many places, a band of dark shaly, more or less carbonaceous material, containing many impressions of fern and other leaves.

As all the fossils found in the foregoing series are distinct from those yet discovered in known horizons, in the other Tertiary basins of the North-West, we have no means of drawing parallels, though they are probably miocene. Whether the extensive lignite beds on Bitter Muddy Creeks, east and north of Fort Bridger, belong to this series or to the horizon of the older Sulphur Creek coal is unknown, these localities being too remote from the route to be examined.

The more modern group described above was never seen in an upheaved or inclined condition, like the estuary beds on Bear River, though it is manifest that the general contour of the country has been considerably modified since its deposition, as this formation was often seen occupying some of the most elevated positions.

Beneath this series heavy deposits were observed at several places, consisting of light and whitish fine grained sandstone in thick layers, interstratified with bright red, arenaceous shales. Although these beds appeared to be conformable with the superimposed Tertiary, as no organic remains were found in them, their age must be regarded as doubtful.

From the foregoing remarks it will be seen that these collections furnish no evidence of the existence of strictly marine Tertiary deposits in the Green River Basin, but like all those yet obtained in Nebraska, point to the conclusion that the Tertiary strata of this central portion of the Continent were deposited in brackish and fresh waters. The oldest of these formations, so far as known, contain a group of mollusca indicating brackish waters, while all the subsequent formations are of strictly fresh water origin.

Another fact worthy of note is, that all the secondary and Tertiary fossils collected during the survey came from localities east of the Wahsatch range of mountains, while all the specimens collected west of that range of mountains, in the Great Basin, came from Palaeozoic rocks.

In the ranges of mountains west of the 116th degree of longitude, to the Sierra Nevada, near lat. 39°, igneous rocks predominate, and only few traces of stratified rock were found in that district, in none of which any organic remains were observed.

F. B. MEEK and H. ENGELMANN.

Catalogue of Birds collected during a survey of a route for a ship Canal across, the Isthmus of Darien, by order of the Government of the United States, made by Lieut. N. Michler, of the U.S. Topographical Engineers, with notes and descriptions of new species.

BY JOHN CASSIN.

The route surveyed by Lieut. Michler, for the purpose of ascertaining the practicability of establishing communication by water, between the Atlantic and Pacific Oceans, was mainly by way of the river Atrato and its tributaries, the Truando and the Nercua. In the performance of this duty, the Atrato was ascended for a distance of about ninety miles, to the mouth of the Truando, and then a southwesterly route pursued along the latter towards the Pacific Ocean. The Nercua is a tributary of the Truando at a distance of thirty-six miles from the union of the latter with the Atrato.

The most interesting localities mentioned in the present catalogue are on those two rivers, especially after the Truando reaches the Cordilleras, in which in a great measure it and the Nercua have their course. These localities have been but very partially explored by naturalists. Another locality frequently mentioned is Turbo, which is a small village on the Atlantic, directly on the eastern side of the Gulf of Uraba or Darien, and nearly opposite to the mouths or delta of the Atrato.

This collection was made by Mr. William S. Wood, Jr. and Mr. Charles J. Wood of Philadelphia, who accompanied the Expedition, and were of course under the immediate direction of the chief officer of the Expedition, Lieut. N. Michler, of the U. S. Topographical Engineers. This accomplished officer and gentleman encouraged in the fullest degree investigations in Natural History throughout the route, whenever consistent with other duties, and as opportunity presented. To his enlightened views and evident appreciation of the interesting character of the zoology of the country traversed by the Expedition, science in America is indebted for the present valuable collection, including several birds never before known, and other valuable additions to the zoology of this continent.

1. *HYPOTRIORCHIS FEMORALIS*, (Temminck).

Falco femoralis, Temm., Pl. Col. i. liv. 21.

Temm. Pl. Col. 121, 343, U. S. Pacific R. R. Reports, x. pl. 1.

From Carthage.

2. *MORPHNUS GUIANENSIS*, (Daudin)?

Falco guianensis, Daud. Tr. d'Orn. ii. p. 78?

Lesson. Traite d'Orn. ii. pl. 11?

From the river Truando. One specimen only, not adult, and in bad condition, appears to be this or a nearly allied species.

"Observed once only, in the Rio Truando, at the first camp, after leaving the Atrato. I noticed this eagle at first perched in a high tree, but after I had fired at a small bird, he immediately flew very rapidly and fiercely directly towards the spot where I was standing, as though he intended to pounce upon me. He approached within a few feet, when I shot him with small bird shot." (Mr. C. J. Wood.)

3. *ASTURINA MAGNIROSTRIS*, (Gmelin).

Falco magnirostris, Gm. Syst. Nat., i. p. 282, (1788.)

Temm. Pl. Col. 86, Buff. Pl. Enl. 464.

From Turbo.

4. *BUTEOGALLUS NIGRICOLLIS*, (Latham).

Falco nigricollis, Lath., Ind. Orn. i. p. 35, (1790).

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Aquila milvoides, Spix?

Spix, Av. Bras. i. pl. 1, d? Le Vaill. Ois. d'Afr. i. pl. 20.

From the river Truando. "Only observed in trees on the Rio Truando, about 40 or 50 miles from the Cordilleras." (Mr. C. J. Wood).

5. *URUBITINGA MEXICANA*, Du Bus.

Morphnus mexicanus, Du Bus, Bull. Acad. Brussels, 1847, p. 102.

From the delta of the Atrato. Specimens of this little known species are quite identical with others from Mexico in the museum of this Academy. It is accurately described by the Viscount Du Bus as above cited.

6. *IBYCTER AQUILINUS*, (Gmelin).

Falco aquilinus, Gm. Syst. Nat. i. p. 280, (1788).

Buff. Pl. Enl. 417, Vieill. Gal. i. pl. 6.

From Turbo, on the Atlantic, and the river Truando, near the Cordilleras.

"Abundant in the vicinity of the village of Turbo, but less numerous in the interior. Always seen in trees, and utters a very disagreeable note bearing some resemblance to the *gobble* of the male Turkey." (Mr. C. J. Wood).

7. *NYCTIDROMUS GUIANENSIS*, (Gmelin).

Caprimulgus guianensis, Gm. Syst. Nat. ii. p. 1030, (1788).

Caprimulgus albicollis, Lath. Ind. Orn. ii. p. 585, (1790).

Buff. Pl. Enl. 733.

From Turbo.

Smaller than *N. americanus*, but much resembling that species.

8. *PROGNE CHALYBEA*, (Gmelin)?

Hirundo chalybea, Gm. Syst. Nat. i. p. 1026, (1788)?

Young birds from Carthagera, very difficult to recognize, but much resembling the species I understand to be as here given.

9. *COTYLE FLAVIGASTRA*, (Vieillot).

Hirundo flavigastrea, Vieill. Nouv. Dict. xiv. p. 534, (1817).

Hirundo jugularis, De Wied.

Temm. Pl. Col. 161, fig. 2.

From Carthagera and the river Truando.

10. *CERYLE TORQUATA*, (Linnæus).

Alcedo torquata, Linn. Syst. Nat. i. p. 180, (1766).

Buff. Pl. Enl. 284.

From the rivers Atrato and Truando.

Numerous specimens in the collection of the Expedition, which are exclusively adults, in fine plumage.

"Very abundant in the immense swamps on the Atrato and Truando, alighting on the low trees, and uttering a loud shrill note. Catches small fishes apparently very easily, on account of their abundance, and returns to the tree." (Mr. C. J. Wood).

11. *CERYLE AMAZONA*, (Latham).

Alcedo amazona, Lath. Ind. Orn. i. p. 257, (1790).

Alcedo vestita, Dumont.

Du Bois, Orn. Gal. pl. 85.

From the river Nercua.

12. *CERYLE INDA*, (Linnæus).

Alcedo inda, Linn. Syst. Nat. i. p. 179, (1766).

Alcedo viridirufa, Bodd. Tab. Pl. Enl. p. 36, (1783).

Alcedo bicolor, Gm. Syst. Nat. i. p. 451, (1788).

Edwards, Glean. vii. pl. 355. Buff. Pl. Enl. 592.

From Turbo.

Common enough in South American collections, but never quite correctly

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named in catalogues, nor hardly elsewhere. Naturalists evidently overlook the solemn fact that Linnæus gives the *habitat* of his species as above cited, "in India *occidentali*!" The name *inda* seems to have been understood to mean a far distant country, beyond the Ganges, and evidently misled even Boddart and Gmelin, but is strictly applicable to this bird. It can readily be recognized from the descriptions and Edwards' figure above cited.

"One specimen seen in a salt water marsh, near the village of Turbo, very quiet and easily approached." (Mr. C. J. Wood).

13. CERYLE SUPERCILIOSA, (Linnæus).

Alcedo superciliosa, Linn. Syst. Nat. i. p. 179, (1766).

Edwards, Glean. v. pl. 245, Buff. Pl. Enl. 756, fig. 2, 3.

From Turbo.

"In a salt water marsh, almost in the village of Turbo, one specimen only seen perched in a bush, which was obtained without difficulty, being very unsuspicious." (Mr. C. J. Wood).

14. JACAMEROPS GRANDIS, (Gmelin).

Alcedo grandis, Gm. Syst. Nat. i. p. 458, (1766.)

Le Vaill. Jacamars, pl. 54.

From the river Truando.

"First camp after leaving the Atrato, and the only time that this bird was noticed. Sits in a tree and darts after insects like a fly-catcher." (Mr. C. J. Wood).

15. GALBULA RUFICAUDA, Cuvier.

Galbula ruficauda, Cuv. Reg. An. i. p. 420, (1817).

Le Vaill. Jac. pl. 50, Vieill. Gal. i. pl. 29.

From the river Nercua.

One specimen only, in bad condition, which appears to be this species, but is darker chestnut brown on the abdomen, than other specimens now before me.

16. BUCCO RUFICOLLIS, Lichtenstein.

"*Bucco ruficollis*, Licht." Wagler, Isis, 1829, p. 658.

Tamatia bicincta, Gould, Proc. Zool. Soc. London, 1836, p. 80?

Tamatia gularis, D'Orb. et Lafres. Rev. Zool. 1838, p. 166?

From the river Truando.

"Seen once only, at the first camp on the Truando, after leaving the Atrato." (Mr. C. J. Wood).

For all that I can see this is the young of *B. bicincta*, Gould, as above, with which *B. gularis*, D'Orb, appears to be synonymous.

17. MALACOPTILA PANAMENSIS, Lafresnaye.

Malacoptila panamensis, Lafres. Rev. Zool. 1847, p. 79.

From the river Truando.

"Very quiet and inactive, starting out occasionally from its perch to capture an insect, and then returning." (Mr. C. J. Wood).

18. MONASA PALLESCENS, nobis.

Rather larger than any other known species; wing rather long, fifth quill longest; tail moderate, with the feathers wide. Front and lores white, entire head, quills, upper and under tail coverts black, with a greenish lustre, (no white on the chin nor throat), upper and under wing coverts, back, rump and under parts of body cinereous; very light on upper wing coverts, and darker on the back; bill red, sexes alike.

Total length about 11 inches, wing 5½, tail 5 inches.

Hab. Cordilleras mountains on the river Truando, New Grenada. In National Museum and Mus. Acad. Philadelphia. Discovered by Mr. Chas. J. Wood and Mr. Wm. S. Wood, Jr.

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This is a remarkable and apparently new species of *Monasa*, strictly of the same group, and related to *M. Morphocus* (= *albifrons* and *personata*) and *M. peruana*. Like those species, the present bird has a conspicuous white frontal band, which reaches very nearly from one eye to the other, but it differs from those species in being without any white whatever on the throat. It is, however, easily distinguished from all known species, by the cinereous color of the body above and below and wing coverts; which color is very light, and in some specimens nearly white on the whole of the upper wing coverts, and but slightly darker on the under wing coverts. Several specimens labelled as both sexes are in the collection from the river Truando.

Stated by Messrs. W. S. and C. J. Wood, to have been seen once only in the Cordilleras on the river Truando, in January, 1858. A party of eight or ten specimens was observed sitting very quietly in a tree at some distance from the ground, and being quite regardless of the gun or the presence of man, several were obtained. Specimens labelled as females are slightly larger than those stated to be males.*

19. TROGON MASSENA, Gould.

Trogon Massena, Gould, Monog. Trogonidæ, (1838).

Gould, Mon. Trog. pl. 16.

From the Truando, and also from the delta of the Atrato.

All the specimens in the collection are of young birds in but indifferent condition, amongst which one specimen may be the young of *T. macrourus*.

*The following species of *Monasa* are in the Museum of this Academy:

1. MONASA ATRA, (Boddart).

Cuculus ater, Bodd. Tab. Pl. Enl. p. 30, (1783).

Cuculus tranquillus, Gm. Syst. Nat. i. p. 417, (1788).

Bucco cinereus, Gm. Syst. Nat. i. p. 409, (1788).

Corvus australis, Gm. Syst. Nat. i. p. 377, (1788).

Bucco calcaratus, Lath. Ind. Orn. i. p. 206, (1790).

Corvus affinis, Shaw, Gen. Zool. vii. p. 381, (1809).

Buff. Pl. Enl. 512, Le Vaill. Barbets, pl. 44, 45.

2. MONASA MORPHOEUS, (Wagler).

Bucco morphoeus, Wagler, Hahn's Voegel, Asien. Africa, &c. pt. xiv. (1822).

"Bucco leucops, Ill." Licht. Verz. p. 8, (1823).

Bucco albifrons, Spix, Av. Bras. i. p. 53, (1824).

Monasa personata, Vieill. Gal. i. p. 23, (1825).

Hahn, Voegel, pt. xiv. pl. 2. Spix, Av. Bras. i. pl. 41, fig. 1, Vieill. Gal. i. pl. 36.

Swains. B. of Braz. pl. 12.

3. MONASA NIGRIFRONS, (Spix).

Bucco nigrifrons, Spix, Av. Bras. i. p. 53, (1824).

Lypornix unicolor, Wagler, Syst. Av. (1827, not paged).

Spix, Av. Bras. i. pl. 41, fig. 2.

4. MONASA AXILLARIS, (Lafresnaye).

Monasa axillaris, Lafres. Rev. et Mag. Zool. April, 1850, p. 216.

Monasa flavirostris, Strickland, Jard. Contr. April, 1850.

Jard. Contr. 1850, pl. (not numbered).

It would require nice discrimination to determine with certainty the priority of either of the above names. My impression is that M. Lafresnaye's name is entitled rather to preference, because it bears an unmistakable date, which the other does not, but requires to be determined by examination or approximation.

5. MONASA PERUANA, Verreaux.

"Monasa peruana, Bp. et Verr." label on spec. from M. Verreaux.

Monasa peruana, Sclater, Proc. Zool. Soc. London, 1855, p. 194.

This is very closely allied to the now well known *M. morphoeus*, and scarcely distinguishable without specimens of both. A specimen bearing M. Verreaux's label is in the Acad. Coll., and is therefore entirely reliable as this species.

6. MONASA PALLESCENS, Cassin.

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20. **TROGON MELANOPTERUS**, Swainson.
Trogon melanopterus, Sw. Cab. Cy. p. 332, (1838).
 Gould, Mon. pl. 10, 11.
 From the river Truando.
 One specimen only in adult plumage.
21. **TROGON ATRICOLLIS**, Vieillot.
Trogon atricollis, Vieill. Nouv. Diet. viii. p. 318, (1817).
 Gould, Mon. pl. 8.
 Falls of the Truando.
 "In the Cordilleras on the Rio Truando. Seen once only, very unsuspicious and easily shot." (Mr. C. J. Wood).
22. **MOMOTUS MARTII**, (Spix).
Prionites Martii, Spix, Av. Bras. i. p. 64, (1824).
Momotus semirufus, Sclater, Rev. et Mag. Zool. 1853, p. 489?
 Spix, Av. Bras. i. pl. 60.
 From the river Nercua.
 One specimen in adult plumage, labelled as a male bird.
23. **CRYPTICUS PLATYRHYNCHUS**, (Leadbeater).
Momotus platyrhynchus, Leadb. Trans. Linn. Soc. Lond. xvi. p. 92, (1829).
Crypticus Martii, Bonap. Proc. Zool. Soc. London, 1837, p. 119.
 Jard. and Selby, Ill. Orn. iii. pl. 106.
 From the Cordilleras on the river Nercua.
 In adult plumage, and in colors singularly resembling the preceding, but with the bill differently formed, and affording strong generic distinctions. This is probably the first time that these two birds, which have much perplexed naturalists, have ever occurred in the same collection. Both are labelled as from the same locality, and I am informed by Mr. C. J. Wood, that they inhabit the forests on the river Nercua, on the western side of the Cordilleras.
24. **RAMPHASTOS TOCARDUS**, Vieillot.
Ramphastos Tocard, Vieill. Nouv. Dict. xxxiv. p. 280.
Ramphastos Swainsonii, Gould. Proc. Zool. Soc. London, 1833, p. 69.
 Gould, Mon. Ramph. pl. 4.
 From the River Nercua.
25. **RAMPHASTOS CARINATUS**, Swainson.
Ramphastos carinatus, Sw. Zool. Ill. i. p. (pl. 45, not paged.)
 Gould, Monog. pl. 2.
 River Nercua. One specimen only, in mature plumage, from the western side of the Cordilleras on the River Nercua.
26. **PTEROGLOSSUS ERYTHROPYGUS**, Gould.
Pteroglossus erythropygius, Gould, Proc. Zool. Soc. London, 1843, p. 15.
 Gould, Monog. pl. 21, Zool. Voy. Sulphur, pl. 28.
 From the River Truando. Specimens labelled as both sexes are in the collection. The females are smaller, and in both sexes there is some variation in the color of the bill as noticed by Mr. Gould, the white being in these specimens more extended in the females.
27. **SELENIDERA SPECTABILIS**, Cassin.
Selenidera spectabilis, Cass. Proc. Acad. Philada. 1857, p. 214.
 Jour. Acad. Philada. iv. pl. 1.
 From the falls of the River Truando.
 Both sexes of this species, in excellent plumage and preservation are in the collection from the Cordilleras on the River Truando. They are, however, precisely similar to Mr. Mitchell's specimens described by me as above cited, though the occurrence of this little-known species again, and at another locality, is a point of interest.

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28. *ARA MILITARIS*, (Linnæus).
Psittacus militaris, Linn. Syst. Nat. i. p. 139, (1766).
 Le Vaill. Parrots, pl. 6, Edward's Glean. vii. pl. 313.
 From the River Nercua in the Cordilleras mountains.
29. *ARA ARARAUNA*, (Linnæus).
Psittacus ararauna, Linn. Syst. Nat. i. p. 139, (1766).
 Le Vaill. Parr. pl. 3, Lear, Parr. pl. 8.
 From the mouth of the Atrato, Gulph of Uraba.
30. *ARA SEVERA*, (Linnæus).
Psittacus severus, Linn. Syst. Nat. i. p. 140, (1766).
 Le Vaill. Parr. pl. 8, 9, 16, Edward's Glean. v. pl. 229.
 Mouth of the River Nercua.
31. *CONURUS PERTINAX*, (Linnæus).
Psittacus pertinax, Linn. Syst. Nat. i. p. 142, (1766).
 Le Vaill. Parr. pl. 34, Edw. Glean. v. pl. 234.
 Carthagera.
32. *CONURUS TOVI*, (Gmelin).
Psittacus tovi, Gm. Syst. Nat. i. p. 351, (1788).
 Bourj. St. Hil. Parr. pl. 48.
 From the River Atrato.
33. *PSITTACULA CYANOPTERA*, (Boddart).
Psittacus cyanopterus, Bodd. Tab. Pl. Enl. p. 27, (1783).
Psittaculus gregarius, Spix. Av. Bras. i. p. 39, (1824).
 Bourj. St. Hil. Parr. pl. Spix. Av. Bras. i. pl. 34.
 Carthagera.
34. *DRYOCOPUS MALHERBEI*, (G. R. Gray).
Campephilus Malherbii, G. R. Gray, Gen. Birds, ii. p. 436, pl. 108, (1845).
 Malherbe, Monog. Picidæ, pl. 6.
 From Turbo. "Occasionally seen in the forest at Turbo, very shy and difficult to approach." (Mr. C. J. Wood).
35. *DRYOCOPUS ALBIROSTRIS*, (Vieillot).
Picus albirostris, Vieill. Nouv. Dict. xxvi. p. 69, (1818).
Megapicus albirostris, (Vieill.) Malherbe.
 Malherbe, Monog. Picidæ, pl. 4.
36. *CELEUS MENTALIS*, nobis.
 About the size of *C. rufus*, occipital feathers somewhat lengthened, third quill longest, bill rather short. Male, with a large space on the chin and throat, bright scarlet. This space begins nearly on a line with the commissure of the bill on each side, covering the chin and throat, and is not divided in the middle, but is integral.
 Head and upper parts of body dark cinnamon, many feathers having semicircular and crescent shaped spots of black, rump and upper tail coverts lighter. Quills brownish black, barred with dark cinnamon, tail brownish black, all the feathers of which are barred with dull yellowish cinnamon color. Underparts of body yellowish cinnamon, lighter than the back and with the black spots much more numerous, every feather having nearly complete semicircular and crescent shaped bands of black. Under wing coverts uniform dark cinnamon, not spotted, axillaries dark cinnamon with a few imperfect bands of deep black. Bill bluish horn color, under mandible lighter. Female, much like the male, but having no red patch on the throat and the black spots on the under parts not so numerous.
 Total length about 8 inches, wing 4½, tail 1¾ inches.
Hab.—Turbo and Atrato River, New Grenada. Discovered by Messrs. Wm. S. and Chas. J. Wood, Spec. in Nat. Mus. Washington.

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Of this Woodpecker, I have found no description nor figure which seemed to approach it, except *Picus undatus* of authors figured by Edwards, pl. 332. It is nearly the size and of the same general colors as that species, but instead of two patches of red on the cheeks as described and figured in *P. undatus*, the present bird has a single large patch completely enclosing a space on the throat around the base of the lower mandible, similar to that in the common *Picus varius* of the United States. This character I cannot trace in any other species of this genus.

This bird belongs to the same subgeneric group as *Celeus rufus*, which seems to have no name, though readily defined.

37. *CROTOPHAGA MAJOR*, Brisson.

Crotophaga major, Brisson, iv. p. 180, (1760).

Buff. Pl. Enl. 102.

From the River Atrato.

38. *CYANOCORAX PILEATUS*, (Temminck).

Corvus pileatus, Temm. Pl. Col. (liv. 10.)

Temm. Pl. Col. 58.

From the rivers Truando and Nercua. "In flocks on the high trees on the Truando before reaching the mountains. Very shy and noisy, calling out loudly whenever an attempt was made to approach them. (Mr. C. J. Wood).

39. *QUISCALUS MACROURUS*, Swainson.

Quiscalus macrourus, Sw. Cab. Cy. p. 299, (1838).

Rept. U. S. and Mex. Bound. Survey, Birds, pl. 20.

From Turbo and Carthagena. "In parties of ten or a dozen feeding on berries along the sea shore. Abundant, especially at Carthagena, and noisy, but not easily shot." (Mr. C. J. Wood).

40. *OXYALUS WAGLERI*, (G. R. Gray).

Cacicus Wagleri, G. R. Gray, Gen. Birds, ii. p. 342, (1845).

Gray's Genera, ii. pl. 85.

From the rivers Truando and Nercua. Specimens of both sexes in mature plumage, the females being much the smaller.

41. *OSTINOPS CRISTATUS*, (Gmelin).

Oriolus cristatus, Gm. Syst. Nat. i. p. 387, (1788).

Sw. B. of Bras. pl. 32, Buff. Pl. Enl. 328.

From Turbo and the Atrato River.

"In company with smaller species along the Atrato, and seemed to be feeding on the fruit of a tree which grew plentifully on the edge of the water. Unsuspicious and easily approached." (Mr. C. J. Wood).

42. *OSTINOPS GUATIMOZINUS*, Bonaparte.

Ostinops guatimozinus, Bonap. Compte Rend., 1853, p. 833.

Large, resembling *O. Montezumae* and *O. bifasciatus*, but larger than either, darker colored, and with the crest feathers much longer and more slender. Male.—Head, under parts of body and tibiae brownish black, under tail coverts chestnut brown, same as the back. Entire upper parts of body, wing coverts and outer webs of quills purplish chestnut brown. Tail graduated, two middle feathers brownish black, all others yellow. Naked space below the eye completely divided by a line of short imbricated feathers nearly on a line with the lower edge of the lower mandible. Crest long and composed of very narrow feathers. Bill wide at base in front, high and compressed, pointed, basal two-thirds black, terminal one-third light colored (red?). Total length about 21½ inches, wing 10½, tail 8½ inches. Crest feathers 3 inches, bill from gape 3¼ inches.

Hab.—River Truando, New Granada.

One specimen, labelled as a male, in the collection of the Expedition is dis-

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tinct from any species in Acad. Coll. or that we find described, except as above. It is nearly allied to *O. Montezumae* of Mexico and Central America, and *O. bifasciatus* of Northern Brazil, both of which are in the Acad. Coll. and are distinct from each other.

The present bird differs from both of the above species in being larger, darker colored and having a lengthened almost filiform crest. The bill also is disproportionately longer and wider at base, with a rounded termination in front. It is not without scruples that I apply the name above to this bird; the description by the Prince Bonaparte, as cited, not being sufficient for the recognition of any species nearly related to another.*

"At Camp Abert, on the Truando, before reaching the Cordilleras, one specimen only seen, which was shot; it was very shy and seemed to be a stranger." (Mr. C. J. Wood.)

43. *CASSICUS ICTERONOTUS*, Vieillot.

Cassicus icteronotus, Vieill.

Sw. B. of Braz., pl. 3.

From Turbo and the delta of the Atrato River. "Very abundant at Turbo, builds many nests on the same tree, which are long and hanging, and entered from the top. Always seen in large parties and very noisy, especially in the morning, although their notes are rather agreeable." (Mr. C. J. Wood).

44. *CASSICUS CHRYSONOTUS*, Lafresnaye?

Cassicus chrysonotus, Lafres.

D'Orb. Voy. Am. Mer. Ois. pl. 52?

From Turbo. A single specimen in young plumage appears to be this species.

45. *CASSICUS UROPYGIALIS*, Lafresnaye?

Cassicus uropygialis, Lafr. Rev. Zool. 1843, p. 290?

Falls of the River Truando.

Specimens not mature nor in good condition appear to be this species.

* The three nearly allied species are as follows:

1. *OSTINOPS BIFASCIATUS*, (Spix).

Cassicus bifasciatus, Spix, Av. Bras., i. p. 65 (1824).

Spix, Av. Bras., i. pl. 61.

Naked space on the cheek, integral (not divided as in the two succeeding species). Crest feathers rather long, not so narrow nor so long as in *O. guatimozinus*, but longer than in *O. Montezumae*. Head and breast brownish black, entire upper parts of body, abdomen, under tail coverts and *tibiae* light chestnut brown, tail yellow, central two feathers dark brown. Total length, male 18 to 20 inches. Naked space on cheek precisely as figured by Spix as above cited, which figure is sufficiently accurate. Two specimens from Para, in Acad. Coll.

2. *OSTINOPS MONTEZUMAE*, (Lesson).

Cassicus Montezumae, Less. Cent. Zool. p. 33, (1830).

Less. Cent. Zool. pl. 7, Gervais, Atlas de Zool. pl. 33.

Naked space on the cheek partially divided by a line of short imbricated features above the lower edge of the lower mandible. Crest feathers short and inconspicuous, shorter than in either of the other species here described. Plumage much as in preceding, but with the *tibiae* brownish black. Total length, male, about 20 inches. Naked space on cheek accurately represented in both plates above cited, which are otherwise very accurate. Nine specimens in Acad. Coll. including Lesson's original which is labelled as from Mexico, others are from Nicaragua.

3. *OSTINOPS GUATIMOZINUS*, Bonaparte.

Ostinops guatimozinus, Bonap. Compt. Rend. 1853, p. 833.

Naked space on cheek completely divided by a line of short, imbricated feathers nearly on a line with the lower edge of lower mandible. Crest feathers long and pendant, longer than in either of the preceding. Plumage generally resembling that of both the preceding, but darker, entire under parts brownish black, *tibiae* black. Total length 21 to 22 inches. One specimen in National Museum, Washington.

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46. *ICTERUS MESOMELAS* (Wagler).

Psarocolius mesomelas, Wagl.

Lesson, Cent. Zool. pl. 22.

From the River Atrato.

47. *ICTERUS GIRAUDII*, Cassin.

Icterus Giraudii, Cass. Proc. Acad. Philad'a, iii. p. 332 (1847).

Journ. Acad. Philad'a, i. pl. 17.

From the Rivers Truando and Nercua and the "Shores of the Pacific."

Several specimens differing somewhat in size are from the Cordilleras and the western coast, until quite reaching the Pacific Ocean. One specimen obtained by Mr. W. S. Wood, Jr., is labelled "Shores of the Pacific."

"In bushes and low trees on the Truando, and has very pleasant notes of the same general character as those of the Baltimore Oriole. Solitary and rather wild." (Mr. C. J. Wood).

48. *XANTHORHYNUS AFFINIS*, Lawrence.

Xanthornus affinis, Lawr. Am. Lyc. New York, 1851, p. 113.

From the Atrato. A single specimen in adult male plumage.

49. *EUSPIZA AMERICANA* (Gmelin).

Emberiza americana, Gm. Syst. Nat. i. p. 872 (1788).

Wilson, Am. Orn. i. pl. 3. Aud. B. of Am. pl. 384, Oct. ed. iii. pl. 156.

From Turbo. "In flocks early in April, about grassy places at Turbo, and seen for one day only." (Mr. C. J. Wood).

50. *PITYLUS GROSSUS* (Linnæus).

Loxia grossa, Linn. Syst. Nat. i. p. 307 (1766).

Buff. Pl. Enl. 154.

From the Falls of the River Truando. "In the mountains and seen once only. Has a loud, musical note similar to that of the Cardinal bird of the United States." (Mr. C. J. Wood).

51. *SALTATOR MUTUS*, Sclater?

Saltator mutus, Sclater, Proc. Zool. Soc., London, 1856, p. 72?

Tanagra superciliaris, Spix, Av. Bras. ii. p. 44, pl. 47?

From Carthage. "On the 'Popa' mountain at Carthage."

Specimens in young plumage not for us easily identified.

52. *ARREMON SCHLEGELI*, Bonaparte.

Arremon Schlegeli, Bonap. Consp. Av. i. p. 488 (1850).

From Carthage. Very fine specimens of this beautiful little bird, in adult plumage.

"In the high grass on the sea shore at Carthage on the seed of which it appeared to feed. Notes and habits generally resembled those of the Sparrows of the United States, not abundant and difficult to obtain." (Mr. C. J. Wood).

53. *PYRANGA AESTIVA* (Gmelin).

Tanagra aestiva, Gm. Syst. Nat. i. p. 889 (1788).

Wilson, Am. Orn. i. pl. 6, Aud. B. of Am. pl. 44, Oct. ed. iii. pl. 208.

From Turbo. "In the forest at Turbo, early in April, seen once only."

54. *ORTHOGONYX OLIVACEUS*, nobis.

Form short and robust, bill rather wide at base, upper mandible with a distinct tooth-like lobe about the middle of its cutting edge, wing moderate, fourth quill slightly longest, tail moderate or rather short. Male.—Front and line extending over and around the eye bright yellow. Throat, middle of abdomen, edge of wing at shoulders and under wing coverts greenish yellow. Upper parts of head and body dark olive green, under parts olive green tinged with yellowish, the latter color more apparent in the middle, under tail coverts

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greenish yellow. Quills brownish black, with their outer webs dark olive, uniform with the back, tail dark olive, inner webs of outer feathers greenish brown. The yellow on the throat somewhat striped or spotted with dark olive. Bill bluish horn color, legs lighter. Sexes similar.

Total length about $6\frac{3}{4}$ inches, wing $3\frac{1}{2}$, tail $2\frac{1}{2}$ inches.

Hab.—Cordilleras Mountains, on the River Truando, New Granada. Discovered by Mr. W. S. Wood, Jr., and Mr. C. J. Wood, attached to U. S. Expedition for surveying the River Atrato, in command of Lieut. N. Michler, U. S. Topog. Engineers. Spec. in Nat. Mus., Washington.

This is a curious bird and has not a little puzzled the present writer. My impression is that it is an undescribed genus related to *Icteria* and more so to *Orthogonys* and not unlike some species of *Pyranga*. At present I rate it as an *Orthogonys* to which it quite as much belongs as *Pyranga cyanicterus* of authors at least, of which there are several specimens in the Academy collection.

Mr. C. J. Wood states that this bird inhabits low trees and bushes in the Cordilleras, on the Rio Truando, and could be constantly heard at some localities, though not so easily seen. Its notes are loud and much varied, bearing a general resemblance to those of the Chat of North America (*Icteria viridis*). It appeared to be very active and lively, constantly flying about the bushes and changing its position.

55. TANAGRA CANA, Swainson.

Tanagra cana, Sw. B. of Braz. p. 2, (1841).

Sw. B. of Braz. pl. 37.

From Turbo.

"Abundant in the orange and lime trees at Turbo, and in gardens and other cultivated localities at Carthagenas. Note only a single chirp and very unsuspicious and easily shot." (Mr. C. J. Wood).

56. RAMPHOCELUS ICTERONOTUS, Bonaparte.

Ramphocelus icteronotus, Bonap. Proc. Zool. Soc. London, 1836, p. 121.

Du Bus, Esq. Orn. pl. 15.

From Turbo and the rivers Atrato and Truando.

"Always observed frequenting one kind of tree, that grows along streams of water, on the fruit of which it feeds. Abundant on the Rio Truando in the month of March." (Mr. C. J. Wood).

57. RAMPHOCELUS DIMIDIATUS, Lafresnaye.

Ramphocelus dimidiatus, Lafres. Mag. Zool. 1837, p. (not paged).

Guerin's Mag. Zool. 1837, pl. 81.

From Turbo.

"Abundant in April in the bushes and low trees in the drier parts of the forest. Solitary but constantly seen, and heard only to utter a single chirp. (Mr. C. J. Wood).

58. EUCOMETIS CRISTATA, (Du Bus).

Pipilopsis cristata, Du Bus, Bull. Acad. Brussels, 1855, p. 154.

From the river Truando.

"At the first camp on the Truando after leaving the Atrato. In the bushes and low trees, very shy, and seen once only in a party of three together. Sings very pleasantly, and very loud for the size of the bird." (Mr. C. J. Wood).

59. TACHYPHONUS LUCTUOSUS, D'Orb. et Lafres.

Tachyphonus luctuosus, D'Orb. et Lafres. Mag. Zool. 1837, p. 29.

D'Orb. Vey. Am. Mer. Ois. Pl. 20.

From the Truando.

"Obtained during our encampment in the mountains, on the Rio Truando. In the high trees, and rarely seen, and very shy and active. Male black, female brown." (Mr. C. J. Wood).

1860.]

60. TACHYPHONUS DE LATTREI, Lafresnaye.

Tachyphonus De Lattrei, Lafres. Rev. Zool. 1847, p. 72.

Falls of the Truando.

"Seen once only, in the bushes on the bank of the Rio Truando, in the month of March. About twenty specimens which seemed to be in company, were noticed and several obtained, though they were very shy and not easily approached. All chattered together like a flock of blackbirds, and appeared to be feeding on a berry that was abundant." (Mr. C. J. Wood).

61. TACHYPHONUS XANTHOPYGIUS, Selater.

Tachyphonus xanthopygius, Selater, Proc. Zool. Soc. Lond. 1854, p. 158.

Proc. Zool. Soc. London, 1854, pl. 69, 1855, pl. 90.

From the Truando.

The male only, of this handsome and remarkable species, precisely as figured by Mr. Selater.

"The wildest bird I met with in the whole journey. A portion of the surveying party remained fifteen days at a camp in the Cordilleras, on the Rio Truando, where only this bird was obtained, and was so very shy and watchful, that it was with difficulty obtained. Three specimens were together and were observed to always resort to one tree to roost, and constantly frequenting the highest trees. Very active and perpetually on the move from one tree to another, notes loud and musical, somewhat like those of the Baltimore Oriole of the United States." (Mr. C. J. Wood).

62. TACHYPHONUS?

Falls of the Truando.

One specimen labelled as a female, but which is of no species with which I am acquainted, nor find described. Not having the male I do not venture a description.

63. CALLISTE FRANCESCÆ, (Lafresnaye).

Aglaia Fanny, Lafres. Rev. Zool. 1847, p. 72.

Des Murs. Icon. Orn. pl. 56.

From Turbo.

"In a tree that grows along streams of water, on the fruit of which it feeds. Rather shy and not easily approached, very quick and active." (Mr. C. J. Wood).

64. CALLISTE INORNATA, Gould.

Calliste inornata, Gould, Proc. Zool. Soc. London, 1855, p. 158.

Sclater, Monog. Calliste, pl. 45.

From Turbo.

Probably the female or young, of the preceding, (*C. francescæ*), and given by us as distinct, with some reluctance. The specimens in the collection are very nearly as described and figured as cited above.

"In the same tree, and appeared to be in company with the preceding, and thought by my brother and myself to be the female of that bird." (Mr. C. J. Wood).

65. CALLISTE LAVINIÆ, Cassin.

Calliste Lavinia, Cass. Proc. Acad. Philadelphia, 1858, p. 178.

From the river Truando.

We have much gratification in finding in the present collection, the second specimen that we have ever seen of this interesting little species, though not in mature plumage. It bears, however, the characteristic edging of rufous on the outer webs of the quills, and is easily recognised.

"Shot at camp Toucey, in the mountains on the Rio Truando. In high trees, very active and lively, and not easily obtained, though not often seen, March, 1858." (Mr. C. J. Wood).

[April,

66. *EUPHONIA FULVICRIS*, Selater.

Euphonia fulvicris, Selater, Proc. Zool. Soc. Philada. 1856, p. 276.

Falls of the Truando.

"At our encampment in the mountains on the Rio Truando, in the high trees, and difficult to shoot. Not often seen, and quite shy and watchful." (Mr. C. J. Wood).

67. *NEMOSIA AURICOLLIS*, Selater.

Nemosia auricollis, Selater, Proc. Zool. Soc. London, 1856, p. iii.

From the river Truando.

"At the first camp on the Truando, before reaching the mountains. In the bushes growing abundantly in the extensive marshes and swamps on that river. Appeared to have habits much like those of the Wrens, and constantly repeated its notes, so as easily to be followed. (Mr. C. J. Wood).

68. *LIPAUGUS UNIRUFUS*, Selater.

Lipaugus unirufus, Sclat. Proc. Zool. Soc. London, 1859, p. 385.

Querula fuscocinerea, Lafres. Rev. Zool. 1843, p. 291?

From Turbo and the river Truando.

Entire plumage light rufous, darker on the back, and lighter on the under parts of the body and under wing coverts; quills and tail rufous cinnamon, shafts and inner webs of quills darker. Total length, about 9 inches, wing 5, tail $4\frac{1}{2}$ inches. Sexes alike.

Several specimens labelled as both sexes, are from Turbo and the river Truando, and all have the appearance of being in young or some peculiar seasonal plumage. These specimens are all of an uniform dull rufous, very nearly the color of the immature plumage in some species of black *Tachyphonus* which induces me to suppose that the adult of this bird is quite different in color from the present specimens. Although undoubtedly of the genus *Lipaugus*, this bird corresponds but indifferently with the last description above cited, though it may be that species in the plumage of another season than that described.

"In the dry parts of the forest at Turbo, and in the Cordilleras on the Rio Truando, in the lower trees. Frequently seen, but always solitary and silent. Sits very quietly in a tree and flies after insects, especially the large coleopterous species, abundant on the route everywhere." (Mr. C. J. Wood).

69. *QUERULA CRUENTA*, (Boddart).

Muscicapa cruenta, Bodd. Tab. Pl. Enl. p. 23, (1783).

Buff. Pl. Enl. 381, Vieill. Gal. pl. 115.

From Turbo. "Very abundant and in large parties in the thick and dry parts of the forest at Turbo. Constantly chattering and noisy, frequently seen on the ground, and seemed to prefer low bushes. Female entirely black." (Mr. C. J. Wood).

70. *SAUROPHAGUS LICTOR*, (Lichtenstein).

Lanius lictor, Licht. Verz. p. 49, (1823).

Gray, Genera of B. i. pl. 62.

From the Rivers Atrato and Truando.

71. *TYRANNUS DOMINICENSIS*, Brisson.

Tyrannus dominicensis, Briss. Orn. ii. p. 394, (1760).

Aud. B. of Am. pl. 46, Oct. ed. i. pl. 55.

From Carthage.

72. *TYRANNUS MELANCHOLICUS*, Vieillot.

Tyrannus melancholicus, Vieill. Nouv. Dict. xxxv. p. 48, (1819).

Spix, Av. Bras. ii. pl. 19.

From Turbo, Carthage and the River Truando.

73. *MYIARCHUS FEROX*, (Gmelin).

1860.]

- Muscicapa ferox*, Gm. Syst. Nat. i. p. 934, (1788).
Buff. Pl. Enl. 571, fig. 1.
Falls of the Truando.
74. *ELAENIA CAYENNENSIS*, (Linnæus).
Muscicapa cayennensis, Linn. Syst. Nat. i. p. 327, (1766).
Buff. Pl. Enl. 569, fig. 2.
From Turbo.
75. *SAYORNIS ARDOSIACUS*, (Lafresnaye).
Tyrannula ardosiaca, Lafres. Rev. Zool. 1844, p. 80.
Falls of the Truando. "A pair observed about rocks at the foot of the mountains, on the Truando. Had some very pleasing notes and almost a continued song, very shy." (Mr. C. J. Wood).
76. *MYIOBIUS SULPHUREIPYGUS*, (Sclater).
Tyrannula sulphureipygia, Sclater, Proc. Zool. Soc. London, 1856, p. 296.
From the River Truando.
77. *TYRANNULA ALBICEPS*, (D'Orb. et Lafres).
Muscipeta albiceps, D'Orb. et Lafres. Mag. Zool. 1837, p. 47.
From Carthagera.
78. *TYRANNULA ALBICEPS*?
Apparently an accidental variety of the preceding, having the back light yellow or canary color. One specimen from Carthagera.
79. *CYCLORHYNCHUS BREVIROSTRIS*, Cabanis.
Cyclorhynchus brevirostris, Cab. Wiegman. Arch. 1847, p. 249.
From the River Truando.
80. *PLATYRHYNCHUS CANCROMA*, (Lichtenstein).
Todus cancruma, Licht. Verz. p. 51, (1823).
Temm. Pl. Col. 12, fig. 2, Sw. Zool. Ill. ii. pl. 115.
From the Truando.
"At Camp Toucey, on the Truando, soon after leaving the Atrato. In the high trees and difficult to obtain." (Mr. C. J. Wood).
81. *TODIROSTRUM CINEREUM*, (Linnæus).
Todus cinereus, Linn. Syst. Nat. i. p. 178 (1766).
Buff. Pl. Enl. 585, fig. 3.
From Carthagera.
"Occasionally seen on the 'Popa' Mountain, near Carthagera, in the bushes and low trees, flying out after insects, which it caught on the wing with much dexterity, and which were very abundant, mostly small *Diptera*." (C. J. Wood).
82. *TODIROSTRUM NIGRICEPS*, Sclater.
Todirostrum nigriceps, Sclater, Proc. Zool. Soc. London, 1855, p. 66.
Proc. Zool. Soc. London, 1855, pl. 84.
From Turbo.
"In the drier parts of the forest at Turbo, occasionally seen, but not common. Caught insects of the same description as the preceding, and resembled it in general habits." (Mr. C. J. Wood).
83. *TODIROSTRUM EXILE*, Sclater.
Todirostrum exile, Sclater, Proc. Zool. Soc. London, 1857, p. 83.
Proc. Zool. Soc. London, 1857, pl. 125.
From Carthagera.
"In the bushes and low trees, constantly flying after insects, and uttering a single chirp, by which it could easily be traced and shot. Frequently seen in the month of April." (Mr. C. J. Wood).

(To be continued.)

[April,